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Utah Department of Transportation - Research Division
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Report No. UT-19.18

REVIEW OF THE UDOT PROCUREMENT PROCESS FOR A MAINTENANCE MANAGEMENT SYSTEM

Prepared For:

Utah Department of Transportation
Research & Innovation Division

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Final Report
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16. Abstract

The Utah Department of Transportation (UDOT) contracted with Dye Management Group, Inc. (DMG) to conduct an outside review of the process to procure a maintenance management system (MMS). In March of 2018, UDOT issued a request for proposal (RFP) for a commercial off-the-shelf (COTS) maintenance management system. After receiving and evaluating proposals and conducting presentations and demonstrations, UDOT selected two vendors for final evaluation. However, neither vendor solution was considered an ideal fit as proposed. As a result, UDOT cancelled the MMS RFP. Since that time, UDOT has been refining the scope of work in order to identify a successful vendor.

The results of this research project will assist UDOT in assessing the initial procurement process, evaluating the work-to-date on a new procurement process, and developing recommendations to help ensure UDOT is able to agree upon a vendor which will serve it best. This includes:

- Enhancing functional and technical requirements
- Refining the scope of work for a new MMS RFP
- Recommending improvements to the procurement process
- Summarizing results and lessons learned that may be shared with other states as best practices

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UDOT MMS Procurement Review Report




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Utah Department of Transportation
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Executive Summary

In March of 2018, the Utah Department of Transportation (UDOT) issued a request for proposal (RFP) for a commercial off-the-shelf (COTS) maintenance management system (MMS). After receiving and evaluating proposals and conducting presentations and demonstrations, UDOT selected two vendors for final evaluation. However, neither vendor solution was considered an ideal fit as proposed. As a result, UDOT cancelled the MMS RFP.

Subsequently, DMG conducted a thorough review of UDOT's MMS RFP materials and procurement process. After our initial review of the RFP materials, DMG conducted workshop interviews with key UDOT RFP evaluation team members to help us further our understanding of what went well and what did not during the RFP process. The interviewees represented a cross section of the organization, including members from the project governance team, project subject matter experts team, and the technical team. We also included procurement staff to ensure we had a full understanding of the initial procurement process as well as procurement options available for the next MMS RFP.

High-Level Findings

Our assessment of the RFP materials showed that most desirable aspects of a state-of-the-art MMS were covered. UDOT's maintenance processes and maintenance quality assurance (MQA) program were well-described using familiar stages of the maintenance lifecycle. DMG provided some observations and general suggestions, including:

- Increasing the page limit for the proposer's technical response from 20 to 25 pages. Given the scope of the system and its implementation, the additional pages will provide the proposer the ability to elaborate more on key requirements.

- A clearer definition of anticipated system interfaces should be provided as part of the RFP. Developing interfaces can often be costly, and ensuring vendors are informed about the systems, directionality, and frequency of the interface will allow them to develop a more precise cost estimate.

- Specific requirements for how the DOT intends to use mobile technology should be included in the RFP. Does the DOT anticipate a constant mobile cellular connection or will a disconnected approach work?

- One key issue with maintenance systems in other states is post-implementation system performance, particularly as datasets grow over time. The RFP should specify system performance as a quantifiable requirement.

DMG noted that vendors asked ninety-seven questions during the RFP process, which is more than a DOT would typically expect to see for this type of project. To help ensure proposers clearly understand the RFP, we recommend that UDOT include their responses to the most frequently

asked vendor questions as part of the project scope, requirements, or general RFP stipulations, where possible in the next RFP. Suggestion include:

- Multiple questions were asked relating to non-U.S. vendors. We recommend that UDOT clearly define expectations of international firms, where the work will be performed, and anticipated time on site for the selected vendor. For a project of this size and importance, we recommend UDOT put a premium on onsite project approaches for key project phases and deliverables, including specification development, testing, and training.

- Vendors demonstrated an interest in proposing cloud-based software as a service (SaaS) solutions. We recommend that UDOT clearly define all enterprise requirements for SaaS solutions, including allowable web platforms.

Best Practice Recommendations

Based on our review of the RFP materials, our interviews with UDOT team members, and our understanding of MMS procurement best practices, DMG developed a set of recommendations for improving UDOT's procurement process for the next MMS RFP. These improvements included:

1. Seven-Year Total Cost of Ownership Worksheet

Using a total-cost-of-ownership evaluation approach, each vendor will be required to submit costs for nine key bid components for the next seven years. The following recommended bid components cover the major cost categories UDOT can expect from potential vendors:

- Software licensing costs
- Cost for customization of the solution to meet mandatory requirements
- Cost for interface development
- Other implementation services costs
- Annual software maintenance licensing fees, or software as a service (SaaS) subscription cost
- Implementation services costs associated with one major software version upgrade, typically anticipated in year 4
- Performance guarantee cost, if required and if being passed on to UDOT (used only if UDOT were to require a performance bond to award the work)
- Cost of supplemental DOT staff (detailed below)
- Other costs

This approach will also help UDOT better understand the potential cost savings offered through a SaaS-hosted solution compared to a more traditional UDOT-hosted implementation. A sample worksheet is provided in Exhibit 2.

2. Spreadsheet-Based Requirements Register

Many DOTs have had success leveraging a spreadsheet-based requirements register that requires the proposer to indicate how they intend to meet each requirement and the cost of any customization or configuration. We also recommend that the requirements be weighted by priority. Many of the requirements listed in the RFP should be considered mandatory, meaning that the DOT might not consider a proposer if their solution was unable to address even one of them. Other requirements could be listed as important or desirable.

It is also important to understand how the proposer will address each requirement. In many cases, requirements are met with an out-of-the-box software solution where little to no configuration is required. Other requirements may require customization. In some cases, the requirements that necessitate customization may not be mandatory, and could be removed from the scope if the DOT elected to. A sample excerpt from the MMS requirements register and matrix is available in Exhibit 3.

3. Improved Weighting and Scoring Criteria

We recommended improvements to the weighting and scoring criteria used to evaluate critical components of the proposed solutions. The scoring criteria are grouped into two stages. The first stage focuses on review of the proposals to generate a short-list of capable vendors. In this stage, a greater weight (650 points) is given to the proposer's technical response and approach while still recognizing the importance (350 points) of the experience of the proposing firm, their project team, and their understanding of the DOT's needs. The second stage includes an extended proof-of-concept for the short-listed vendors.

The exhibit below shows the recommended scoring criteria for the next MMS RFP.

Recommended RFP Scoring Criteria

Stage	Evaluation Category	Evaluation Criteria	Points	Sum	Total
Stage 1	Project Team / Capability	Project team	100	350	1000
		Experience	150		
		Understanding	100		
	Technical Proposal Narrative	Approach	250	650	
		Technical response: Attachment C	400		
Stage 2	Demonstrations/Proof-of-Concept			800	1000
	Cost Proposal			200	

4. Extended Proof-of-Concept Period for Short-Listed Vendors

Recently, more state DOTs are requesting an extended proof-of-concept period with short-listed MMS vendors to validate their proposed software solution. These hands-on sessions typically last up to a week and are conducted onsite at the DOT location. We recommend noting this requirement in the RFP to ensure commitment from the proposers to participate in the proof-of-concept stage if they are short-listed.

We recommend a one-week, onsite proof-of-concept period, preferably leveraging SaaS if it was proposed, following this schedule:

- **Day 1:** Setup and coordination with DOT.
- **Days 2–4:** Structured functional user group guidance in a "sandbox" environment, using DOT-provided data.
- **Day 5:** Recap with DOT evaluation team; follow-up questions (considered oral presentation/interview)

This approach will allow the DOT to perform a qualitative assessment of each short-listed vendor's solution, including its ability to handle multiple years of DOT maintenance data, demonstrated ability to leverage the DOT's GIS environment, and performance. The proof-of-concept period will help the DOT's evaluation team members assess the solution's user interface to determine if it is "intuitive and easy-to-use," which greatly increases end-user adoptability of the software.

5. Defined SaaS Requirements for Vendor-Hosted Solutions

Most modern MMS offer a SaaS vendor-hosted solution. SaaS offers several advantages over a UDOT-hosted implementation, including: minimal hardware cost, administration, and management of the application; reduced implementation time; streamlined application upgrade release process; and dedicated production and testing environments for software testing. We recommend that the DOT clearly define the requirements for a SaaS solution including enterprise architecture standards for the web platform (e.g., Amazon Web Services, Google).

I. Introduction

The Utah Department of Transportation (UDOT) contracted with Dye Management Group, Inc. (DMG) to conduct an outside review of the process to procure a maintenance management system (MMS). In March of 2018, UDOT issued a request for proposal (RFP) for a commercial off-the-shelf (COTS) maintenance management system. After receiving and evaluating proposals and conducting presentations and demonstrations, UDOT selected two vendors for final evaluation. However, neither vendor solution was considered an ideal fit as proposed. As a result, UDOT cancelled the MMS RFP. Since that time, UDOT has been refining the scope of work in order to identify a successful vendor.

The results of this review will assist UDOT in assessing the initial procurement process, evaluating the work-to-date on a new procurement process, and developing recommendations to help ensure UDOT is able to agree upon a vendor which will serve it best. This includes:

- Enhancing functional and technical requirements
- Refining the scope of work for a new MMS RFP
- Recommending improvements to the procurement process
- Summarizing results and lessons learned that may be shared with other states as best practices

II. Review of UDOT MMS Procurement Process

A. Methodology

DMG began this effort by conducting a thorough review of UDOT's MMS procurement process, including the following materials:

- March 2018 MMS RFP narrative
- Vendor evaluation criteria
- Vendor questions and UDOT's responses during the RFP process
- Project scope of work
- Functional and technical requirements as provided in the RFP

Following our initial review of the RFP materials, DMG scheduled and conducted workshop interviews with key UDOT team members involved in the initial RFP evaluation process. The purpose of these workshop interviews was to help us further our understanding of what went well and what did not during the RFP process. The interviewees represented a cross section of the organization, including members from the project governance team, project subject matter experts team, and the technical team. Additionally, we included procurement staff to ensure we had a full understanding of the initial procurement process as well as procurement options available for the next MMS RFP.

Because this project focused on making recommendations to improve UDOT's RFP process, DMG did not review the proposals or cost information provided by each vendor in response to the RFP.

Leveraging the feedback obtained during the workshop interviews, DMG conducted a more thorough assessment of the RFP materials, comparing them against established best practices and approaches that other DOTs used successfully to procure MMS software.

B. Results and Observations

Our assessment of the RFP materials showed that, in general, most of the desirable aspects of a state-of-the-art MMS were covered. UDOT's maintenance processes and maintenance quality assurance (MQA) program were well-described and followed contemporary best practices, using familiar stages of the maintenance lifecycle.

The following are some high-level observations and suggestions for improvement, some of which will be further addressed in the recommendations section of this report:

- The twenty-page limit for the technical response seems restrictive for such a comprehensive and complex system. Increasing this to 25 pages could allow the vendors to further elaborate.
- A clearer definition of anticipated UDOT system interfaces should be provided as part of the RFP. Developing interfaces can often be costly, and ensuring vendors understand the systems, directionality, and frequency of the interface will allow them to develop a more precise cost estimate.
- Specific requirements for how UDOT intends to use mobile technology should be included in the RFP. Does UDOT expect to be connected at all times or will a disconnected approach work?
- One key issue with maintenance systems in other states is post-implementation system performance, particularly as datasets grow over time. The RFP should specify system performance as a quantifiable requirement.

Through our review of the materials, DMG noted that potential vendors asked ninety-seven questions during the RFP process, which is more than a DOT would typically expect to see for this type of project. To help ensure proposers clearly understand the RFP, we recommend that UDOT include their responses to the most frequently asked vendor questions as part of the project scope, requirements, or general RFP stipulations, where possible. The following are our observations and suggestions for improvement specific to the vendor questions and answers to the RFP:

- Multiple questions were asked relating to non-U.S. vendors. We recommend that UDOT clearly define expectations of international firms, where the work will be performed, and anticipated time on site for the selected vendor. For a project of this size and importance, we recommend UDOT put a premium on onsite project approaches for key project phases and deliverables, including specification development, testing, and training.
- Several questions were asked regarding system interfaces. As noted previously, we recommend that UDOT fully define the interface requirements for the project, including any technological constraints, enterprise architecture requirements, and directionality of the data through the interface.
- Vendors demonstrated an interest in proposing cloud-based software as a service (SaaS) solutions. We recommend that UDOT clearly define all enterprise requirements for SaaS solutions, including allowable web platforms.

Based on our review and subsequent recommendations (outlined in the next section), DMG refined UDOT's original RFP scope of work narrative to include additional requirements that emulate best practices. We also removed the requirements that were provided in the scope narrative and created a requirements register and matrix, which are described in the next section. These are provided as deliverables with this report in Appendix A and B.

III. Recommendations

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Based on our review of the RFP materials, our interviews with UDOT team members, and our understanding of MMS procurement best practices, DMG developed a set of recommendations for improving UDOT's procurement process for the next MMS RFP. These improvements include:

- A seven-year total cost of ownership worksheet provided by each proposer.
- A spreadsheet-based requirements register that requires the proposer to indicate how they intend to meet each requirement and the cost of any customization or configuration; plus additional details on the proposer's ability to meet mandatory requirements compared to those that are important or desirable.
- Improved weighting and scoring criteria for critical components of proposed solutions.
- Extended proof-of-concept period for short-listed vendors that includes a hands-on approach to assessing each proposed solution.
- Defined SaaS requirements for vendor-hosted solutions.

Each of these improvement opportunities is detailed below.

A. Seven-Year Total Cost of Ownership Worksheet

In order to fully understand the total cost of ownership for each proposed solution, UDOT will need to evaluate each vendor using a structured cost analysis. Using this approach, each vendor will be required to submit costs for nine key bid components for the next seven years. The following recommended bid components cover the major cost categories UDOT can expect from potential vendors:

- Software licensing costs
- Cost for customization of the solution to meet mandatory requirements
- Cost for interface development
- Other implementation services costs
- Annual software maintenance licensing fees, or subscription cost if proposing a SaaS solution
- Implementation services costs associated with one major software version upgrade, typically anticipated in year 4
- Performance guarantee cost, if required and if being passed on to UDOT (used only if UDOT were to require a performance bond to award the work)
- Cost of supplemental DOT staff (detailed below)
- Other costs

Using a seven-year total cost of ownership approach helps ensure that a vendor with higher upfront costs for licensing and implementation but lower costs for ongoing software maintenance is evaluated similarly to a vendor with lower upfront costs and higher ongoing costs. This approach will also help UDOT better understand the potential cost savings offered through a SaaS-hosted solution compared to a more traditional UDOT-hosted implementation. Each bid component cost is explained below.

1. Software Licensing

These are costs associated with UDOT's licensing of software for either a per-user or enterprise license approach. Costs are typically higher in this component for non-vendor-hosted solutions.

2. Software Customization

Vendors can meet the RFP requirements in one of three ways: out-of-the-box functionality, configured functionality, and via customization. Generally, customization costs more for the agency and should be avoided when possible. Customization also increases risk on a software implementation project. To ensure UDOT will understand which proposed solutions are the most customized, the total cost of ownership worksheet tracks those costs separately.

3. Interface Development

Interfaces with existing UDOT systems will be a key to the success of the MMS implementation. However, in some cases, the cost for developing the software interface may outweigh the benefits. The total cost of ownership worksheet tracks interface costs so that UDOT can determine the value of each interface.

4. Implementation Services

This bid component includes all cost associated with implementing the proposed solution, including project management, change management, training, testing, and installation and configuration of the system. Not included in the component are interface development and customization costs, as those were tracked separately.

5. Software Maintenance

Most software vendors offer annual software maintenance, which provides the DOT with ongoing application support and access to software available through new versions of the software. This cost is typically a set percentage of the original software licensing fee. For SaaS solutions, an annual subscription cost would be provided in the component. Each vendor will be required to details software maintenance costs, or subscription fees, for years 2-6 in the worksheet.

6. Major Software Version Upgrade Implementation

In many cases, DOTs experience the need for a major software upgrade during the first seven years of owning the new system. This is typically when the software is issued a new version and the number to the left of the decimal increases (e.g. version 7.3 to version 8.0). The costs for implementing a new software version can vary between software vendors. The worksheet requires each vendor to estimate the total cost to UDOT for an upgrade in year 4. This cost is typically minimal for SaaS software solutions.

7. Performance Guarantee

Some DOTs require proposers to issue a performance bond, typically for the total cost of the proposed solution. This helps ensure the DOT is protected should the software provider or implementer not complete the project successfully. This line can be removed if UDOT does not require such a performance bond.

8. Supplemental DOT Staff

Software vendors that follow best practices understand that leveraging knowledgeable DOT staff during the implementation is critical to the project's success. However, the level of effort expected from UDOT staff can vary greatly between vendors. We recommend that UDOT provide fully-burdened rates for key MMS functional and technical staff in the RFP so that each proposer can calculate the level of effort for UDOT to implement the project.

Exhibit 1 provides sample rates provided by the UDOT team for this effort. These should be reviewed and refined prior to the new MMS RFP.

Exhibit 1: UDOT Fully-Burdened Rates for MMS Software Project Roles

Role	Hourly Rate
Project Sponsor	$ 83
Technical Project Manager	$ 77
Business Owner	$ 50
Functional Resource	$ 63
Client Interface Primary Contact	$ 55
Network and Operations Supervisor	$ 75

9. Other

Any costs not included in the other eight bid components. The worksheet includes space for the vendor to clarify these costs.

Exhibit 2 shows a sample seven-year total cost of ownership worksheet.

Exhibit 2: Sample Seven-Year Total Cost of Ownership Worksheet

Bid Component	FY21	FY22	FY23	FY24	FY25	FY26	FY27	Total	Costing Assumptions
Software licenses	$330,000	$290,000	X	X	X	X	X	$620,000	FY21 - Module licenses plus 25 users FY22 - 380 end-user licenses
Customization required to meet mandatory requirements	$0	$0	X	X	X	X	X	$0	NA
Interface development	$37,800	$0	X	X	X	X	X	$37,800	Costs included in Attachment 2.
Other implementation services	$362,000	$161,000	X	X	X	X	X	$523,000	
Annual software maintenance	X	X	$105,000	$110,000	$115,000	$120,000	$125,000	$575,000	17% of license fees for year 1 with a 5% escalation each year thereafter.
Implementation services associated with software upgrade in post-production Year 4.	X	X	X	$50,000	X	X	X	$50,000	Regular maintenance upgrades to ensure perpetual "new" product. This eliminates the need for a major upgrade in Year 4.
Performance Guarantee	$48,000	X	X	X	X	X	X	$48,000	
Supplemental DOT Staff	$168,000	$105,000	X	X	X	X	X	$273,000	
Other costs	$0	$0	X	X	X	X	X	$0.00	NA
Annual Total Cost of Ownership:	$945,800	$556,000	$105,000	$160,000	$115,000	$120,000	$125,000	$2,162,800	

B. Spreadsheet-Based Requirements Register

In the March 2018 MMS RFP, UDOT provided extensive functional and technical requirements as part of the scope of work narrative. Based on the twenty-page limit for the technical response in the RFP, we suspect that vendors may have had difficulty providing a one-to-one response for each requirement. Other DOTs have had success leveraging a spreadsheet-based requirements register that requires the proposer to indicate how they intend to meet each requirement and the cost of any customization or configuration, and we recommend this for UDOT as well.

We also recommend that the requirements be weighted by priority. Many of the requirements listed in the RFP should be considered mandatory, meaning that UDOT might not consider a proposer if their solution was unable to address even one of them. Other requirements could be listed as important or desirable.

Finally, it is important to understand how the proposer will address each requirement. In many cases, requirements are met with an out-of-the-box software solution where little to no configuration is required. Other requirements may require customization. In some cases, the requirements that necessitate customization may not be mandatory, and could be removed from the scope if UDOT elected to.

DMG has developed a draft UDOT MMS requirements register and matrix that addresses these concerns (see Appendix B). The summary tab in the matrix provides an overview of how many requirements the proposer can meet within each weighting category.

Exhibit 3 shows a sample excerpt from the MMS requirements register and matrix.

Exhibit 3: Sample Excerpt from UDOT MMS Requirements Matrix

Req #	Functional Requirements	Importance			Meets Requirement?			Level of Effort	
		Mandatory	Important	Desirable	Yes, OTB	Yes, Customization Required	No	Hours	$
1.01	Budget must be generated at the station level and construction level and then build to a Region Level	X							
1.02	Budgets must be distributed from Central and make their way down to stations	X							
1.03	Each Fiscal year will include: a. Requested Budget b. Approved/Initial Budget c. Working Budget	X							
1.04	System should include intuitive and interactive Business Intelligence tools to help all parties effectively manage their budget at a glance.		X						
1.05	System must drill down into details from Finet and the system information that has not yet been pushed to Finet	X							
1.06	System must incorporate both an initial budget as well as a Three-Year planning budget for larger projects.	X							
1.07	The Facilities, Lands and Buildings, and Rest Area budgets must be tracked in the system.	X							
1.08	A Pavement request and tracking budget must be included in the system. A function of this is to assign function numbers to each project.	X							
1.09	System can accommodate external contractors bids and track costs.		X						
1.1	System must efficiently represent the Construction Field Crew Requests.	X							
1.11	System must effectively manage the EFM and Methods project budget.	X							
1.12	System must interact with FINET (see Section Seven for phases of FINET interaction) to provide near real-time financial numbers and employee loaded rates. a.) Budgets need to be displayed on activity screen (or other screens where applicable) when creating a work order or a work request so that the station supervisor can see what he has remaining in his budget to perform the work. b.) Electronic PO's that could then be sent for signature should be developed in the system so there is less paperwork.	X							

Total Requirements:	**12**
OTB Requirements:	**0**
Customization Requirements:	**0**
Requirements Not Met	**0**
Percent OTB:	**0%**

Mandatory:	**10**	**83%**
Important:	**2**	**17%**
Desirable:	**0**	**0%**
Total:	**12**	

C. Improved Weighting and Scoring Criteria

DMG is recommending improvements to the weighting and scoring criteria used to evaluate critical components of the proposed solutions. These improvements include:

- Combine Key Personnel (critical to delivery of the project) and Organizational Structure (basic firm and project team information) into a new criterion called Project Team, and increase its weighting.
- Revise the Experience criterion to reflect similarly-scoped projects with peer agencies within the last three years (a minimum of two "live" implementations of a software solution).
- Change the name of the Suitability criterion to Understanding, providing the vendor an opportunity to develop a narrative that addresses why their solution is best suited for UDOT; innovations with their solution, team, or approach; and value-added functionality.
- In the technical proposal, increase the weighting of the mandatory requirements in Attachment C, and include a QA/QC process and project management approach.

Exhibit 4 shows the recommended scoring criteria for the next MMS RFP.

Exhibit 4: Recommended RFP Scoring Criteria

Stage	Evaluation Category	Evaluation Criteria	Points	Sum	Total
Stage 1	Project Team / Capability	Project team	100	350	1000
		Experience	150		
		Understanding	100		
	Technical Proposal Narrative	Approach	250	650	
		Technical response: Attachment C	400		
Stage 2	Demonstrations/Proof-of-Concept			800	1000
	Cost Proposal			200	

D. Extended Proof-of-Concept Period for Short-Listed Vendors

Recently, DMG has observed more state DOTs requesting an extended proof-of-concept period with short-listed MMS vendors to validate their proposed software solution. These hands-on sessions typically last a few days to a week and are conducted onsite at the DOT location. We recommend that UDOT require a commitment from the proposers to participate in the proof-of-concept stage if they are short-listed.

We recommend a one-week, onsite proof-of-concept period, preferably leveraging SaaS if it was proposed, following this schedule:

- **Day 1:** Setup and coordination with UDOT and/or DTS (the Utah Division of Technology Services)
- **Days 2–4:** Structured functional user group guidance in a "sandbox" environment, using UDOT-provided data
- **Day 5:** Recap with UDOT evaluation team; follow-up questions (considered oral presentation/interview)

This approach will allow UDOT to perform a qualitative assessment of each short-listed vendor's solution, including its ability to handle multiple years of UDOT maintenance data, demonstrated ability to leverage UDOT's GIS environment, and performance. Additionally, the proof-of-concept period will help UDOT's evaluation team members assess the solution's user interface to determine if it is "intuitive and easy-to-use," as noted in the requirements.

The proof-of-concept will be scored as part of the procurement evaluation, noted in Exhibit 4. While we have observed vendors accepting this approach to demonstrate their capabilities, UDOT has expressed potential interest in offering the short-listed vendors a stipend to compensate them for their time on site.

E. Defined SaaS Requirements for Vendor-Hosted Solutions

We expect that most MMS vendors responding to the RFP will propose a SaaS vendor-hosted solution. SaaS offers several advantages over a UDOT-hosted implementation, including:

- Minimal hardware cost, if any
- Minimal DTS administration and management of the application
- Subscription cost includes all software version upgrades, which are managed by the software provider
- Dedicated production and testing environments to validate software enhancements prior to release
- Reduced implementation time

DTS requirements for enterprise architecture mandate either Amazon Web Services or Google's web platform. The new MMS RFP will need to define these web services platform requirements. Based on DTS input, the RFP requirements will need to be updated to reflect additional enterprise architecture standards beyond the web services standards.

Appendix A: Revised RFP Scope Narrative

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Provided as a separate attachment in Microsoft Word format. See the following example pages in PDF format.

Attachment A: RFP Scope of Work

1. **Mandatory Minimum Requirements/Qualifications**
2. **Section One:** Introduction and Background - The Maintenance Management Process at UDOT
3. **Section Two:** The Planning and Budgeting Functional Area
4. **Section Three:** The Organizing Functional Area
5. **Section Four:** The Directing Functional Area
6. **Section Five:** The Managing and Analysis Functional Area
7. **Section Seven:** Interfaces and System Requirements
8. **Section Eight:** Mobile Applications
9. **Section Nine:** Geographic Information System (GIS) Needs and Requirements
10. **Section Ten:** Feature Inventory
11. **Section Eleven:** User Friendly

For purposes of this RFP, UDOT provides the following definitions:

Configurable = Software that is configurable is defined as having the capability to design, arrange, set up, add fields, or shape features for specific uses by setting or adjusting existing parameters. Configurations do not require writing code, and should require little to no assistance from IT personnel to make necessary changes to meet business requirements.

Customizable = Software that is customizable is defined as having the ability to create new functions or change functions to meet specifications or business requirements. Customization may also be needed to integrate or fill-in gaps with existing software. Any work done in this area will be deemed as a Custom Deliverable under Attachment A IT T&Cs.

Out of the Box = "Out of the box" software is defined as having features or functionality that works immediately after installation without any configuration or customization

Mandatory Minimum Requirements/Qualifications

This section contains mandatory minimum requirements that must be met in order for an offer to be considered responsive. For ease of evaluation, an Offeror's proposal must be a point-by-point response, addressing in detail each area of the mandatory minimum requirements and/or qualifications.

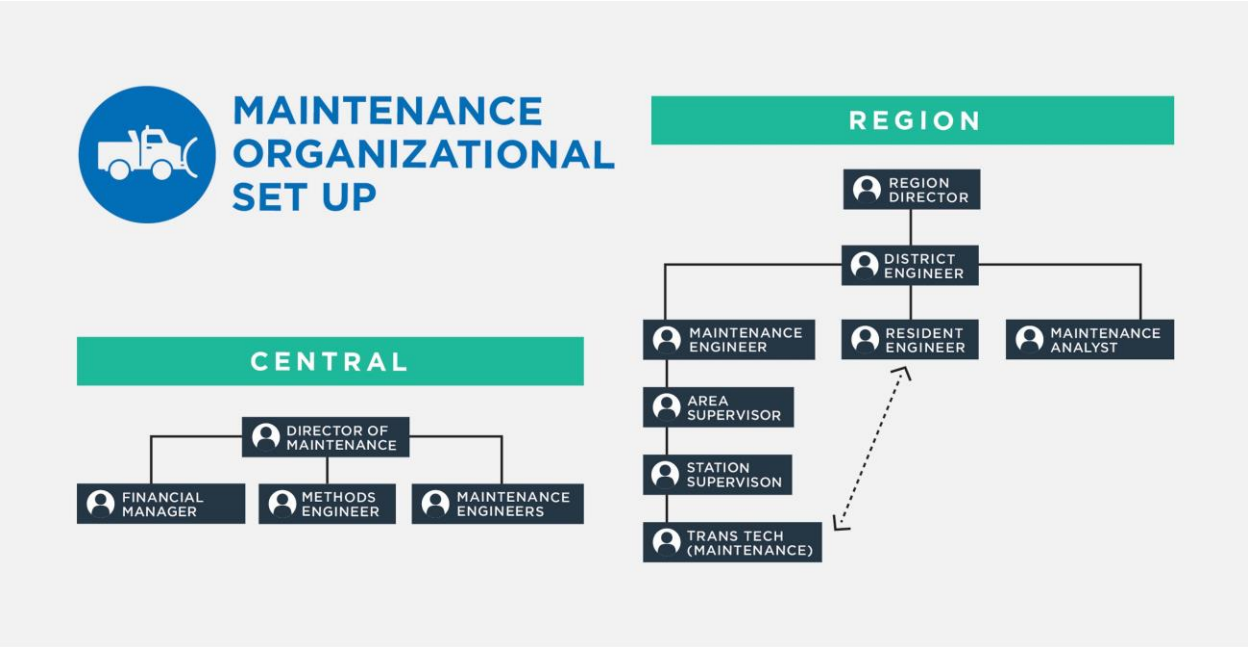
Every document submitted by Offerors in response to this section must be clearly labeled so as to permit evaluators to easily identify the presence or absence of any given document listed below.

Each Offeror's proposal must include:

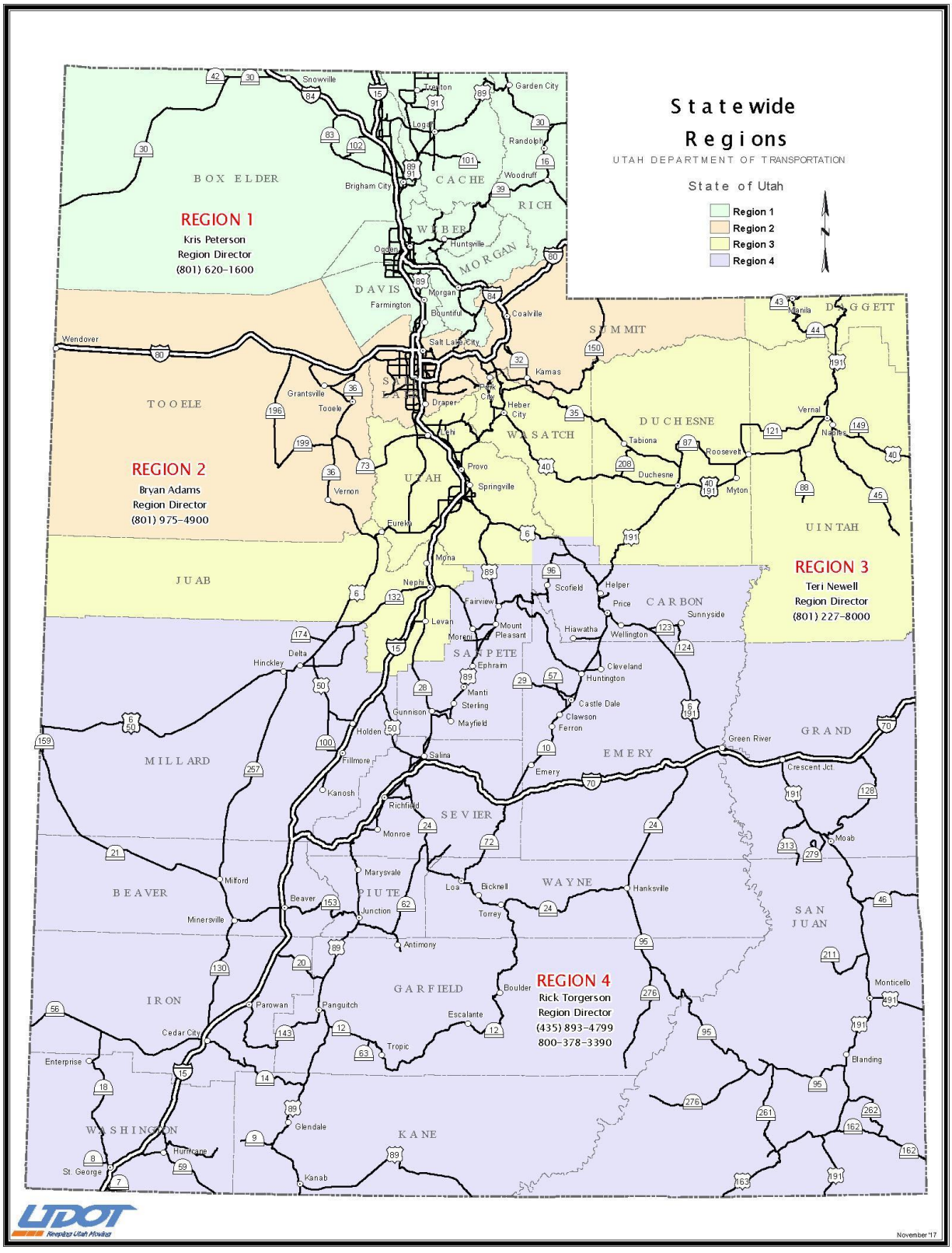
A. Demonstrative evidence that their solution is not a 100% ground up development. Such evidence must include (but is not limited to):
    a. Detailed descriptions (including website links or screen shots) of a system in production
B. Demonstrative evidence that their solution has mobile capabilities. Such evidence must include (but is not limited to):
    a. Detailed descriptions (including website links or screen shots) of a system in production
C. Certification from Offeror that their solution has ability to utilize GPS data.

Section One: Introduction and Background - The Maintenance Management Process at UDOT

UDOT is organized with a Central Maintenance Division that functions to maintain the overall maintenance budget and provide direction and support to Maintenance staff in UDOT's four Regions. See below for a map of the Regions. The Regions cover Northern Utah, Salt Lake Valley and nearby areas, Utah County and nearby areas, and the Southern half of the state being the fourth Region. Each of the Regions is divided between two or three District Engineers. Those areas are then divided into Areas that are managed by an Area Supervisor. There are currently 16 Area Supervisors across the state. Each of the Area Supervisors oversees generally 4-6 maintenance stations that are then each managed by a Station Supervisor. The Station Supervisors manage between 4 to 15 employees (Transportation Technicians) within each station. Transportation Technicians are based in a maintenance station, but may be temporarily assigned from time to time to a construction project under the direction of a Resident Engineer, where they will generally perform construction inspection. UDOT has approximately 85 maintenance crews across the state.



The management of maintenance activities at UDOT is aided by the use of a computerized Maintenance Management System (MMS). The MMS is used by Transportation Technicians and by managers at all levels to plan, organize, schedule, analyze, and manage both day-to-day operations and the annual work program. The MMS is comprised of four major functional areas (Planning, Organizing, Scheduling, & Managing), each of which is described in more detail in the following sections. In simple terms, these functional areas are supported by processes that aid in planning and budgeting, in organizing work, in directing, scheduling, and reporting work, and in analyzing work done in order to more effectively manage the program.



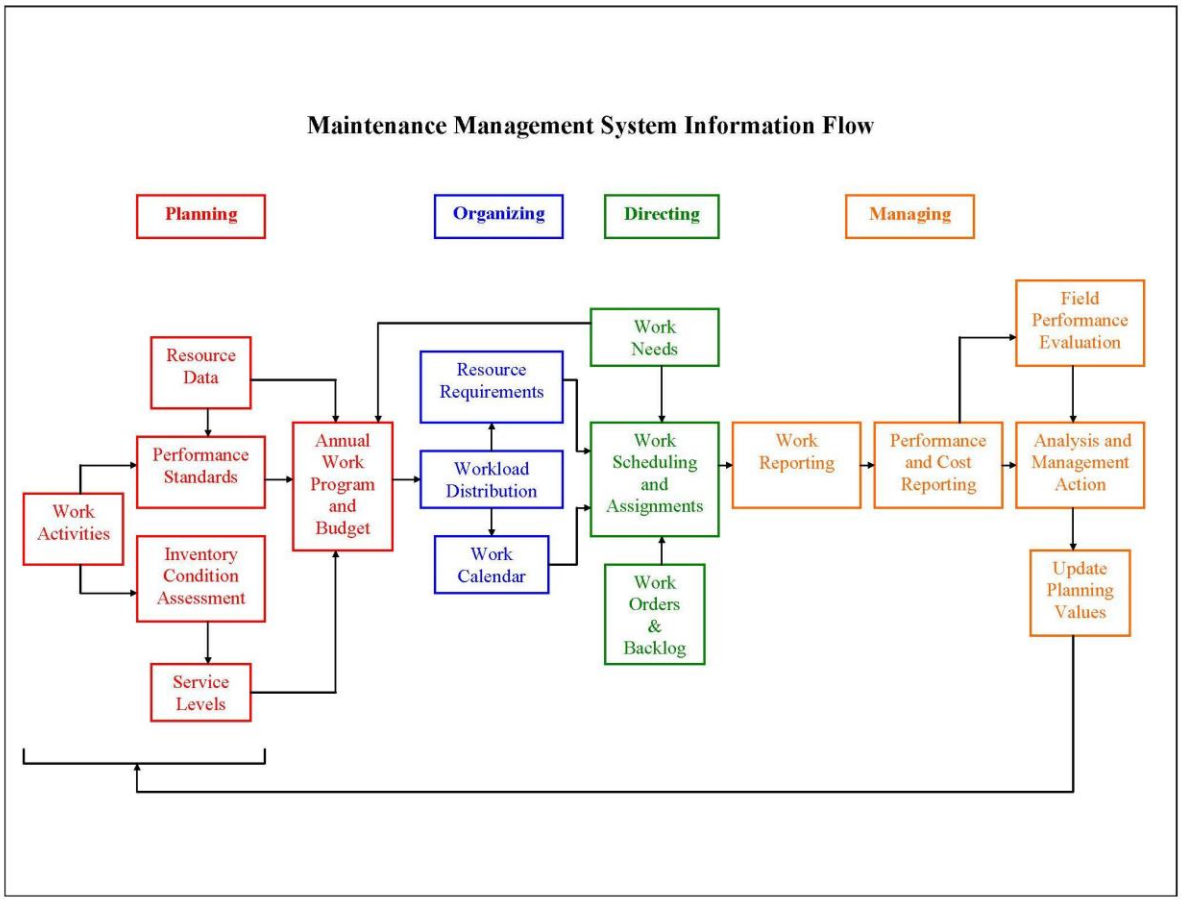
Many of the functional areas share similar processes and data with other areas, so a seamless integration of all areas is critical. In addition, the MMS includes interfaces with a number of data systems managed by other areas of UDOT, or external to UDOT. Some of these systems rely upon the MMS for source data, and the MMS relies upon others for data it consumes. Along with these four functional areas, UDOT is requesting additional areas that will be utilized in the new

MMS system. These new areas are areas that would greatly increase productivity by having them integrated into one system and not in other systems or spreadsheets.

UDOT desires to acquire either a Commercial Off The Shelf (COTS) product featuring most, if not all, of the functionality described in this Scope of Work., or a product that requires mainly configuration (without extensive development of new code or customization of existing code). UDOT also understands, however, that customization may be required to obtain a solution that meets many of the needs described in this Scope of Work.

UDOT also anticipates that there will be additional functionality needed due to additional business function needs and changes in the UDOT business processes. It is expected that UDOT will be able to work with the selected proposer to help meet the changing needs. UDOT would like the ability to configure the existing program when needed to adjust for the changes that may occur in our business process without having to go back to the selected proposer for the changes/revisions.

Diagram of Four Functional Areas



Section Two: The PLANNING AND BUDGETING Functional Area

Overview:

Each fiscal year, UDOT receives approximately $150 Million to perform highway maintenance. This is commonly called the “Code One” budget. At the beginning of each fiscal year, those funds are distributed to approximately 85 maintenance stations and 20 construction crews in each of the four regions. Central Maintenance also receives a budget for Engineer for Maintenance (EFM) and Methods Studies projects. In addition to the initial distribution, approximately $2.5 Million is held at Central Maintenance for emergencies, such as landslides, flooding or snow removal overruns. Near the end of each fiscal year, these emergency funds are released to the Regions to help complete their work load. All labor for an employee hits their home Org Unit (generally a maintenance station). With that in mind we need to be able to track labor costs by home Org Unit and additionally by projects they may have worked on out of their home unit. This is referred to as borrowing an employee in the document.

Key Functionality:

Budgeting

1. **Initial Budget Distribution:**

A “Zero-Based” budget is a concept for developing a budget that is purely based on identified needs. Through this exercise, each year a new budget is developed from scratch, on a base of zero. The premise is that each year UDOT starts with nothing, then builds a budget around the specific activities that need to be performed during the coming year, based on best estimates of the costs of those activities for labor, materials, equipment, and contracts.

2. **Initial Budget Requests by Stations**

For Maintenance, the process starts at the station level. Each station identifies the activities (see below) it will need to accomplish during the year. This includes some activities that are considered to be reactive and some that are programmable. In order to develop its budget, each station considers the condition of its assets, historical costs, and fixed expenses. The result is a requested budget for each station.

The station will then input the budget that is requested for each activity into the system. The system will keep track of the budget giving them a total request for that station. It should be required by the system to show the condition rating for the assets so that the station knows on paper what is required and what may be cut based on condition of the asset. If a station is requesting an increase in budget for an activity for which the assets meet or exceed the condition threshold, then they will need to justify why they are requesting an increase in the budget. Also, there is an understanding that it takes funds to keep the assets in the current condition and it would like to be known what that value is. These values should be calculated from the historical data for each activity and should be specific to each station.

BUDGET CATEGORY	ACT	DESCRIPTION	ACCOMP UNIT	ASSET TYPE	INV UNIT	LOC REQ
8A2	7M66	CONTRACTUAL PVMT MESSAGES	DOLLARS	ROAD SECTIONS	DOLLARS	Y
8A3	7M67	CONTRACTUAL SIGN MAINTENANCE	DOLLARS	ROAD SECTIONS	DOLLARS	Y
8A5	7M68	CONTRACTUAL ATTENUATOR & GUARDRAIL MAINT	DOLLARS	ROAD SECTIONS	DOLLARS	Y
8A7	7M69	CONTRACTUAL SIGNAL REPAIR	DOLLARS	ROAD SECTIONS	DOLLARS	N
8A8	7M70	CONTRACTUAL SWEEPING	DOLLARS	ROAD SECTIONS	DOLLARS	Y
8A9	7M71	CONTRACTUAL ISLAND MAINTENANCE	DOLLARS	ROAD SECTIONS	DOLLARS	Y
9B1	7M72	CONTRACTUAL STATION & YARD MAINTENANCE	DOLLARS	ROAD SECTIONS	DOLLARS	N
9B1	7M73	CONTRACTUAL LAKE POWELL FERRY MAINTENANCE	DOLLARS	ROAD SECTIONS	DOLLARS	N
3A2	7M74	CONTRACTUAL CURB & GUTTER	DOLLARS	ROAD SECTIONS	DOLLARS	Y
10A1	7M75	CONTRACTUAL REST AREA	DOLLARS	REST AREA	DOLLARS	Y
5A2	7M76	CONTRACTUAL BRUSH & TREE REMOVAL	DOLLARS	ROAD SECTIONS	DOLLARS	Y
5A3	7M77	CONTRACTUAL MOWING	DOLLARS	ROAD SECTIONS	DOLLARS	Y
7A2	7M78	CONTRACTUAL GRAFFITI REMOVAL	DOLLARS	ROAD SECTIONS	DOLLARS	Y
9B1	7M80	LANDS & BLDGS (USE REG L & B UNIT FOR ALL COSTS)	MANHOURS	ROAD SECTIONS	MGMT UNIT	N
9C1	7M86	STATION ADMINISTRATION	MANHOURS	ROAD SECTIONS	MGMT UNITS	N
9B1	7M87	STATION BUILDING MAINTENANCE	MANHOURS	ROAD SECTIONS	MGMT UNIT	N
9B1	7M88	SAFETY EQUIPMENT, CLOTHING & ETC.	DOLLARS	ROAD SECTIONS	DOLLARS	N
9B1	7M89	STATION DRIVEWAYS, LOTS, AND YARDS	MANHOURS	ROAD SECTIONS	MGMT UNIT	N
9B1	7M90	STATION SUPPLIES AND SERVICE	DOLLARS	ROAD SECTIONS	DOLLARS	N
9B1	7M91	STATION GENERAL ACTIVITIES (OTHER)	MANHOURS	ROAD SECTIONS	MGMT UNIT	N
9A1	7M92	STATION TRAINING	MANHOURS	ROAD SECTIONS	MGMT UNIT	N
9B1	7M93	STATION UTILITY SERVICES	DOLLARS	ROAD SECTIONS	DOLLARS	N
1A1	7M95	ON CALL / TATS REPORTING	MANHOURS	SNOW PLAN	MGMT UNIT	N
9B1	7M99	STOCKPILING	MANHOURS	ROAD SECTIONS	CUBIC YARD	N
2A1	7S01	BITUMINOUS POTHOLE & SEVERE DEPRESSION	SQUARE YARDS	SURFACE TYPE	S.A. ALL	Y
2A1	7S02	BITUMINOUS CRACK SEALING	SQUARE YARDS	SURFACE TYPE	S.A. BIT	Y
2A1	7S05	MINOR FLUSHING PROJECTS	SQUARE YARDS	SURFACE TYPE	S.A. BIT	Y
3A1	7S22	NON-HARD SURFACE ROAD MAINTENANCE	ROAD MILES	SHOULDERS	MILES N-H ROAD	Y
3A1	7S28	NON-HARD SHOULDER MAINTENANCE	10THS OF A MILE	SHOULDERS	MILES N-H SHLDR	Y
5A3	7S32	MOWING	ACRES MOWED	MOWABLE AREA	ACRES MOWED	Y
5A2	7S33	VEGETATION CONTROL (OTHER)	MANHOURS	VEG. MGMT	MGMT UNIT	Y
4A1	7S38	ADOPT-A-HIGHWAY	LITTER MILES	LITTER PICKUP	LITTER MILES	Y
4A1	7S39	LITTER CONTROL	LITTER MILES	LITTER PICKUP	LITTER MILES	Y
10A1	7S40	REST AREA MAINTENANCE	REST AREA	OTHER FACILITIES	REST AREA	N
8A5	7S41	NOISE WALL MAINTENANCE	SECTION/DAY	WALLS	MGMT UNIT	Y
5B1	7S42	ROADSIDE LANDSCAPE MAINTENANCE	MANHOURS	VEG. MGMT	MGMT UNIT	Y
3A2	7S43	MAINTENANCE & REPLACEMENT OF CURB & GUTTER	LINEAL FT/DAY	SHOULDERS	MILES CURB	Y
4A2	7S44	FENCE MAINTENANCE AND REPAIR	FEET R/W FENCE	FENCES	MI R/W FENCE	Y
4A1	7S45	SPOT LITTER & CARCASS REMOVAL	MANHOURS	LITTER PICKUP	MGMT UNIT	Y
6A1	7S46	PAVED/CONCRETE DITCH MAINTENANCE	FEET PAVED DITCH	CUT DITCH	MI PAV DITCH	Y
8A0	7S49	MAINTAIN TRUCK RUNAWAY LANES	# OF LANES	ROAD SECTIONS	# OF LANES	Y
6A2	7S51	DRAINAGE PROGRAM MAINTENANCE	DRAIN INSTALL.	DRAINAGE	# DRAINS	Y
6A1	7S52	CUT DITCHES, CLEAN & RESHAPE	10TH MI CUT DITCH	CUT DITCH	MI CUT DIT	Y
6A1	7S53	CANYON CUT DITCH CLEANING	CU YDS	CUT DITCH	MI CUT DIT	Y
4A3	7S54	ROCK REMOVAL	MANHOURS	CUT DITCH	MI CUT DIT	Y
6B1	7S55	EROSION REPAIR	EACH	DRAINAGE	MGMT UNIT	Y
6A1	7S56	OPEN SURFACE DRAINAGE MAINTENANCE	CU YDS	DRAINAGE	MGMT UNIT	Y
7A2	7S58	GRAFFITI REMOVAL	MANHOURS	STRUCTURES	MGMT UNIT	Y
8A3	7S63	SIGN AND POST INSPECTION (ANNUAL)	# SIGNS	SIGNS	# SIGNS	Y
8A3	7S64	SIGN AND POST MAINTENANCE (ROUTINE)	# INSTALLATIONS	SIGNS	# SIGNS	Y
8A3	7S65	SIGN VANDALISM REPAIR	# INSTALLATIONS	SIGNS	# SIGNS	Y
8A5	7S66	GUARDRAIL MAINTENANCE	LIN FT	GUARDRAIL / CONC BARR	LIN FT/100	Y
8A9	7S67	TRAFFIC ISLAND MAINTENANCE	MANHOURS	TRAFFIC ISLAND	# ISLAND	Y
8A4	7S68	DELINEATOR POST AND REFLECTOR MAINTENANCE	# DELINATORS	ROAD SECTIONS	# DELIN	Y
8A8	7S69	SWEEPING	MANHOURS	ROAD SECTIONS	MGMT UNIT	Y
8A5	7S70	CABLE BARRIER	LIN FT	GUARDRAIL / CONC BARR	LIN FT/100	Y
8A5	7S71	CONCRETE BARRIER MAINTENANCE	LIN FT	GUARDRAIL / CONC BARR	MILES	Y
8A5	7S72	GLARE SCREEN MAINTENANCE	LIN FT	ROAD SECTIONS	MILES OF GLARE	Y
1A1	7S75	STOCKPILING FOR SNOW REMOVAL	MANHOURS	SNOW PLAN	MGMT UNIT	N
1A1	7S76	HAULING SNOW	MANHOURS	SNOW PLAN	MGMT UNIT	N
1A1	7S77	ANTI-ICING	MANHOURS	SNOW PLAN	MGMT UNIT	N
1A1	7S78	SNOW AND ICE CONTROL	MANHOURS	SNOW PLAN	MGMT UNIT	N
1A1	7S79	SNOW FENCE, MARKERS, AND BARRELS	MANHOURS	SNOW PLAN	MGMT UNIT	Y
1A1	7S80	SNOW AND ICE CONTROL (OTHER)	MANHOURS	SNOW PLAN	MGMT UNIT	N
6B1	7S84	FLOODS AND LANDSLIDES	MANHOURS	CUT DITCH	MGMT UNIT	Y
9B1	8M02	PROJECT INSP & MATERIAL TESTING	MANHOURS	ROAD SECTIONS	MGMT UNIT	N

BUDGET+ CATEGORY	ACT	DESCRIPTION	ACCOMP UNIT	ASSET TYPE	INV UNIT	LOC REQ
2A1	7D06	BITUMINOUS SURFACE REPLACEMENT	TONS	SURFACE TYPE	S.A. BIT	Y
2A1	7D07	BITUMINOUS LANE AND/OR SHOULDER LEVELING	SQUARE YARDS	SURFACE TYPE	S.A. BIT	Y
2A2	7D08	BITUMINOUS SEAL COAT (CHIP SEAL)	SURFACE AREAS	SURFACE TYPE	S.A. BIT	Y
2A2	7D09	BITUMINOUS FLUSH COAT	SURFACE AREAS	SURFACE TYPE	S.A. BIT	Y
2A1	7D10	BITUMINOUS BASE REPAIR	SQUARE YARDS	SURFACE TYPE	S.A. BIT	Y
2A2	7D12	BITUMINOUS ASPHALT SURFACE REJUVENATION	SURFACE AREAS	SURFACE TYPE	S.A. BIT	Y
2A1	7D13	BITUMINOUS SURFACE & SHOULDER MAINTENANCE (SPECIAL)	SQUARE YARDS	SURFACE TYPE	S.A. BIT	Y
2B1	7D14	PCC PAVEMENT PATCHING USING PCC MATERIAL	SQUARE YARDS	SURFACE TYPE	S.A. CONCRETE	Y
2B1	7D15	PCC PAVEMENT CLEANING AND SEALING OF HOT-POUR AND SILICON JOINTS	GALLONS	SURFACE TYPE	S.A. CONCRETE	Y
2B1	7D19	PCC PAVEMENT BITUMINOUS PATCHING	TONS	SURFACE TYPE	S.A. CONCRETE	Y
2A1	7D22	BITUMINOUS PLANING	SQUARE YARDS	SURFACE TYPE	S.A. BIT	Y
3A1	7D30	NON-HARD SHOULDER MAINTENANCE (SPECIAL)	1/10 OF MILES	SHOULDERS	MILES N-H SHLDR	Y
5A1	7D34	VEGETATION CONTROL (CHEMICAL)	ACRES	VEG. MGMT	ACRES	Y
5A2	7D35	BRUSH CUTTING & TREE REMOVAL	LIN FT	VEG. MGMT	SHOULDER FEET	Y
7A3	7D47	CATTLE GUARD MAINTENANCE AND REPAIR	#GUARDS	CATTLE GUARD	# CATTLE	Y
6A1	7D58	DETENTION POND/BASIN MAINTENANCE	# DRAINS	DRAINAGE	# DRAINS	Y
7A1	7D60	STRUCTURE INSPECTION	STRUCT INSTALL.	CATTLE GUARD	# STRUCT	Y
6A2	7D61	SPECIAL DRAINAGE (HYDRO VACUUM)	# DRAINS/CULVERTS	DRAINAGE	# DRAINS	Y
7A1	7D62	STRUCTURE MAINTENANCE/REPAIR	# STRUCT	STRUCTURES	# STRUCT	Y
8A2	7D69	PAINTING TRAFFIC ISLANDS/PARKING LOTS	GALLONS	PAVE MESSAGE	SURF AREA	Y
8A1	7D70	EPOXY STRIPING	GALLONS	PAVE STRIPING	4 INCH MILES	Y
8A1	7D71	PAVEMENT STRIPING	GALLONS	PAVE STRIPING	4 INCH MILES	Y
8A2	7D72	PAVEMENT MESSAGES MAINTENANCE	#LTRS/SYMBOLS /LINES	PAVE MESSAGE	#LTRS/SYMBOLS/LINES	Y
8A3	7D73	NEW SIGN INSTALLATION	INSTALLATIONS/DAY	SIGNS	# NEW SIGNS	Y
8A1	7D74	GUIDELINE (REMOVAL)	LIN FT	PAVE STRIPING	LANE MILES	Y
8A7	7D75	TRAFFIC SIGNAL MAINTENANCE	MANHOURS	SIGNALS	# INSTALLNS	N
8A7	7D76	TRAFFIC SERVICE MAINTENANCE (SPECIAL)	MANHOURS	ROAD SECTIONS	MGMT UNIT	N
8A5	7D77	ATTENUATOR INSPECTION & REPAIR	# ATTENUATORS	ROAD SECTIONS	# ATTENUATOR	Y
8A3	7D78	INTERSTATE SIGN RENOVATION MAINTENANCE	# INSTALLATIONS	SIGNS	SIGNS	Y
8A6	7D79	HIGHWAY LIGHTS MAINTENANCE	MANHOURS	ROAD SECTIONS	# INSTALLNS	N
8A7	7D80	ATMS MAINTENANCE	MANHOURS	ROAD SECTIONS	MGMT UNIT	N
1A1	7D81	SNOW - OPEN & CLOSE ROADS	MANHOURS	SNOW PLAN	MGMT UNIT	Y
1A1	7D83	AVALANCHE CONTROL	MANHOURS	SNOW PLAN	MGMT UNIT	N
9B1	7D84	FERRY MAINTENANCE	MANHOURS	ROAD SECTIONS	MGMT UNIT	N
9B1	7EQP	EQUIPMENT SERVICE AND REPAIR (Not for use!)	MANHOURS	ROAD SECTIONS	MGMT UNIT	N
9B1	7FIX	FIXED EQUIPMENT COST (Not for use!)	DOLLARS	ROAD SECTIONS	MGMT UNIT	N
9C1	7G99	HEALTHY UTAH	MANHOURS	ROAD SECTIONS	MGMT UNITS	N
9B1	7L01	LEAVE	MANHOURS	ROAD SECTIONS	MGMT UNIT	N
9B1	7M01	ACCOUNTS RECEIVABLE	MANHOURS	ROAD SECTIONS	MGMT UNIT	N
9B1	7M02	FEDERAL CONST BY MAINT FORCES	MANHOURS	ROAD SECTIONS	MGMT UNIT	N
9B1	7M03	RECOVERABLE ACCIDENTS	MANHOURS	ROAD SECTIONS	MGMT UNIT	N
2A2	7M04	BETTERMENT (OVERLAY)	SQUARE YARDS	SURFACE TYPE	S.A. BIT	Y
9B1	7M05	BLOCK GRANTS	MANHOURS	ROAD SECTIONS	MGMT UNIT	Y
9B1	7M07	NON-BILLABLE ACCIDENT RESPONSE	MANHOURS	ROAD SECTIONS	MGMT UNIT	N
9B1	7M08	BETTERMENT (OTHER THAN PAVEMENT)	MANHOURS	ROAD SECTIONS	MGMT UNIT	Y
9B1	7M09	NON-RECOVERABLE ACCIDENTS	MANHOURS	ROAD SECTIONS	MGMT UNIT	N
8A6	7M10	CONTRACTUAL LIGHTING REPAIR	DOLLARS	ROAD SECTIONS	DOLLARS	N
9B1	7M11	STATE CONST BY MAINT FORCES	MANHOURS	ROAD SECTIONS	MGMT UNIT	N
5A4	7M12	VEGETATION MANAGEMENT	MANHOURS	VEG. MGMT	MGMT UNIT	Y
9B1	7M15	CLEARING ACTIVITY	MANHOURS	ROAD SECTIONS	MGMT UNIT	N
9B1	7M30	MMQA+ MEASURES	MANHOURS	ROAD SECTIONS	MGMT UNIT	N
1A1	7M51	CONTRACTUAL SNOW REMOVAL	DOLLARS	SNOW PLAN	DOLLARS	N
2A1	7M52	CONTRACTUAL ASPHALT-REACTIVE	DOLLARS	ROAD SECTIONS	DOLLARS	Y
2A2	7M53	CONTRACTUAL ASPHALT - PREVENTIVE	DOLLARS	ROAD SECTIONS	DOLLARS	Y
2B1	7M54	CONTRACTUAL CONCRETE PAVEMENT	DOLLARS	ROAD SECTIONS	DOLLARS	Y
3A1	7M55	CONTRACTUAL NON HARD SURFACE	DOLLARS	ROAD SECTIONS	DOLLARS	Y
4A1	7M56	CONTRACTUAL LITTER PICKUP	DOLLARS	ROAD SECTIONS	DOLLARS	Y
4A1	7M57	CONTRACTUAL CARCASS REMOVAL	DOLLARS	ROAD SECTIONS	DOLLARS	N
4A2	7M58	CONTRACTUAL FENCE REPAIR	DOLLARS	ROAD SECTIONS	DOLLARS	Y
4A3	7M59	CONTRACTUAL ROCK REMOVAL	DOLLARS	ROAD SECTIONS	DOLLARS	Y
9B1	7M60	CONTINGENCY FUNDS	DOLLARS	ROAD SECTIONS	DOLLARS	N
5A1	7M61	CONTRACTUAL VEGETATION - CHEMICAL	DOLLARS	ROAD SECTIONS	DOLLARS	Y
6A2	7M62	CONTRACTUAL DRAINAGE PROGRAM	DOLLARS	ROAD SECTIONS	DOLLARS	Y
6B1	7M63	CONTRACTUAL EROSION REPAIR	DOLLARS	ROAD SECTIONS	DOLLARS	Y
7A0	7M64	CONTRACTUAL STRUCTURE MAINT	DOLLARS	ROAD SECTIONS	DOLLARS	Y
8A1	7M65	CONTRACTUAL PAVEMENT STRIPING	DOLLARS	ROAD SECTIONS	DOLLARS	Y

3. Initial Pavement Maintenance Requests:

A concurrent process occurs at the region level for pavement maintenance (hard surface) activities. Based upon input from the pavement management system (dTIMS), observations noted at semiannual station inspections, and input from each station supervisor and the region pavement management engineer, a team in each region identifies specific needs for hard surface maintenance. These include preventive pavement maintenance activities such as seal coats and crack sealing, and minor pavement repairs such as lane leveling, surface repairs, thin overlays, or others. Typically, a list of potential pavement maintenance projects is produced, each with a location, activity, and estimated cost identified. Projects on this list are included as part of the overall region budget request. It would be desirable that this list have a space holder for a function number (identifying number used in the state accounting system) to be assigned automatically by the system when it is needed. That need would be triggered by some type of action taken by the person using the program. Either a “funded” button or something of that nature.

4. Initial Construction Field Crew Requests:

A concurrent process occurs for construction management activities. Each Resident Engineer, understanding roughly which projects will be his or her responsibility, develops a project-level budget outlining what resources (manpower, equipment, consulting services, etc.) will be necessary to properly manage each project. These project-level budgets are rolled into a zero-based budget request for each construction crew. The construction crew budget that we fund only contains UDOT labor including overtime, UDOT equipment, and overhead. The consulting services, transportation technician labor, and other costs are used to review and analyze the project.

The District Engineer consolidates the crew level requests into a single construction budget request for the region. In the construction budgets they need to be able to budget for transportation technician labor also that will be borrowed from the maintenance stations. This gives the ability to make sure the maintenance stations and the construction crews are budgeting the same amount of time that may be needed. The reason for this is because the transportation technicians’ wages are paid out of their home unit. So the maintenance station where the transportation technician works on a normal basis pays for the labor for the transportation technician to work in construction.

5. Initial Region Request

The second step is for the Region to compile and consolidate the station level requests into a single region-level request. This is done by the District Engineers, with heavy support from their Region Maintenance Analysts, and in cooperation with the area supervisors and the station supervisors. In many cases the region leadership, understanding the total approximate budget that will be available, identifies some optional or deferrable activities that may be of lower priority, and reduces the overall budget request accordingly, or there could be an increase that is requested if the data shows that it is needed.

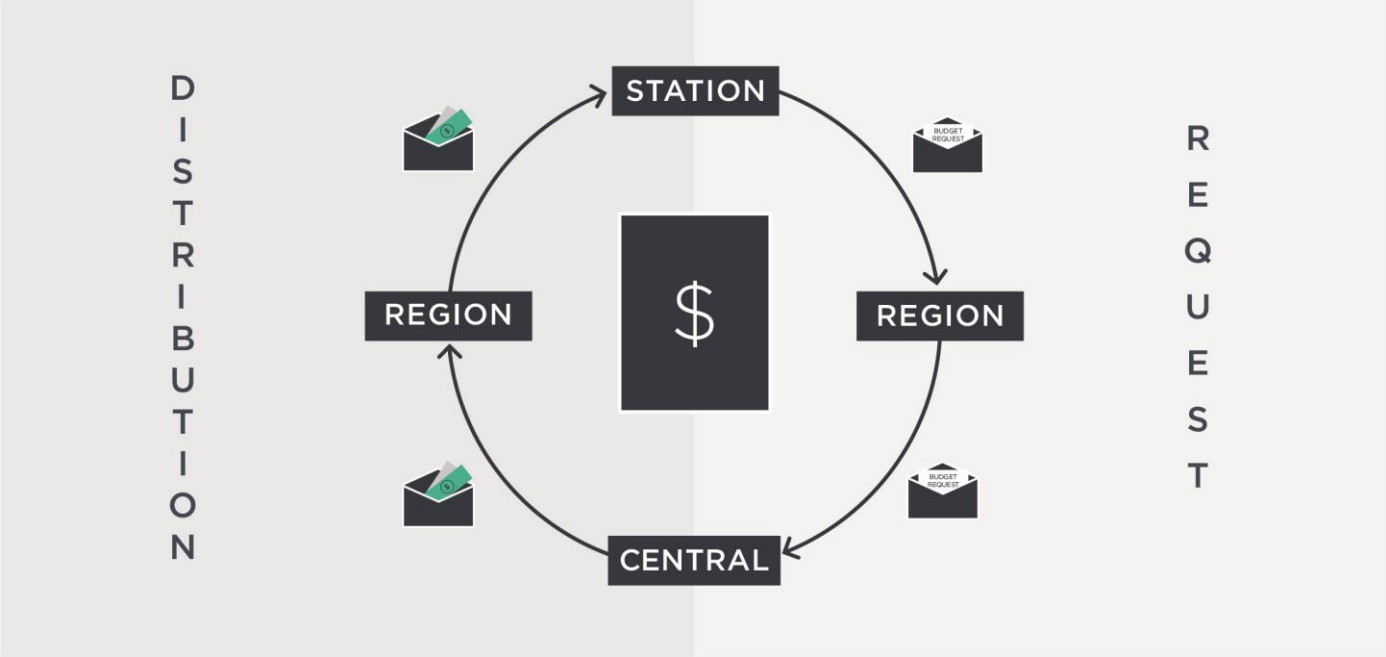
At the completion of this step, the region sends the proposed region-level budget to Central Maintenance for review. The Region Maintenance Analyst performs this function in the system by combining the stations’ budgets into one larger maintenance budget by groups, and also the construction crew-level budgets into one construction budget. This gives Central Maintenance the ability to analyze the complete budget at a higher (statewide) level.

6. Allocation of Budgets to Regions

The third step occurs at the central level. Central Maintenance, working in cooperation with Central Construction, receives all of the region level requests, for both maintenance and construction activities. By this time, the total available budget as allocated by the State Legislature is known, so the central team works together, in cooperation with the regions, to fit the total requests into the available budget. This will require the use of a condition assessment process within the MMS that will adequately reflect the condition of Highway Right of Way both achieved in the past, and desired for the future. It also involves examining priorities among the various work activities. Inevitably, Central may make some cuts.

In doing so, Central examines the region budgets not only in relation to overall priorities, but also in relation to each other. Before settling on final budgets for each region, Central conducts meetings with each region's leadership to be sure the reasons for their requests are understood. The final output, then, is an approved budget for each region, outlining dollar amounts for each activity group, including construction management.

The final step is for each region to finalize its own allotted budget into a working budget. Because the allotted budgets from Central are by activity groups (groups of closely associated activities - see list below), not individual activities, the region can make adjustments within activity groups, and across stations, and even from one activity group to another within certain limits. After these final adjustments are made, the result is a working level budget for each region, and for each station and construction crew.



DESC.	BUDGET CATEGORY	ACT	DESCRIPTION	ACCOMP UNIT	INV UNIT	LOCATION	ASSET TYPE
SNOW AND ICE	1 A 1	7D81	SNOW - OPEN & CLOSE ROADS	MAN-HOURS	MGMT UNIT	FROM/TO OR SPOT	SNOW PLAN
		7D83	AVALANCHE CONTROL	MAN-HOURS	MGMT UNIT	NONE	SNOW PLAN
		7M51	CONTRACTUAL SNOW REMOVAL	DOLLARS	100 DOLLARS	NONE	SNOW PLAN
		7M95	ON CALL / TATS REPORTING	MAN-HOURS	MGMT UNIT	NONE	SNOW PLAN
		7S75	STOCKPILING FOR SNOW REMOVAL	MAN-HOURS	MGMT UNIT	NONE	SNOW PLAN
		7S76	HAULING SNOW	MAN-HOURS	MGMT UNIT	NONE	SNOW PLAN
		7S77	ANTI-ICING	MAN-HOURS	MGMT UNIT	NONE	SNOW PLAN
		7S78	SNOW AND ICE CONTROL	MAN-HOURS	MGMT UNIT	NONE	SNOW PLAN
		7S79	SNOW FENCE, MARKERS, AND BARRELS	MAN-HOURS	MGMT UNIT	FROM/TO OR SPOT	SNOW PLAN
		7S80	SNOW AND ICE CONTROL (OTHER)	MAN-HOURS	MGMT UNIT	NONE	SNOW PLAN
HARD SURFACE MAINTENANCE	2 A 1	7D06	BITUMINOUS SURFACE REPLACEMENT	TONS	S.A. BIT	FROM/TO OR SPOT	SURFACE TYPE
		7D07	BITUMINOUS LANE AND/OR SHOULDER LEVELING	SQUARE YARDS	S.A. BIT	FROM/TO OR SPOT	SURFACE TYPE
		7D10	BITUMINOUS BASE REPAIR	SQUARE YARDS	S.A. BIT	FROM/TO PR SPOT	SURFACE TYPE
		7D13	BITUMINOUS SURFACE & SHOULDER MAINTENANCE (SPECIAL)	SQUARE YARDS	S.A. BIT	FROM/TO OR SPOT	SURFACE TYPE
		7D22	BITUMINOUS PLANING	SQUARE YARDS	S.A. BIT	FROM/TO OR SPOT	SURFACE TYPE
		7M52	CONTRACTUAL ASPHALT-REACTIVE	DOLLARS	100 DOLLARS	FROM/TO OR SPOT	ROAD SECTIONS
		7S01	BITUMINOUS POTHOLE & SEVERE DEPRESSION PATCHING	SQUARE YARDS	S.A. ALL	FROM/TO OR SPOT	SURFACE TYPE
		7S02	BITUMINOUS CRACK SEALING	SQUARE YARDS	S.A. BIT	FROM/TO OR SPOT	SURFACE TYPE
		7S05	MINOR FLUSHING PROJECTS	SQUARE YARDS	S.A. BIT	FROM/TO OR SPOT	SURFACE TYPE
	2 A 2	7D08	BITUMINOUS SEAL COAT (CHIP SEAL)	SURFACE AREAS	S.A. BIT	FROM/TO OR SPOT	SURFACE TYPE
		7D09	BITUMINOUS FLUSH COAT	SURFACE AREAS	S.A. BIT	FROM/TO OR SPOT	SURFACE TYPE
		7D12	BITUMINOUS ASPHALT SURFACE REJUVENATION	SURFACE AREAS	S.A. BIT	FROM/TO OR SPOT	SURFACE TYPE
		7M04	STATE BETTERMENT (OVERLAY)	SQUARE YARDS	S.A. BIT	FROM/TO OR SPOT	SURFACE TYPE
		7M53	CONTRACTUAL ASPHALT - PREVENTIVE	DOLLARS	100 DOLLARS	FROM/TO OR SPOT	ROAD SECTIONS
	2 B 1	7D14	PCC PAVEMENT PATCHING USING PCC MATERIAL	SQUARE YARDS	S.A. CONCRETE	FROM/TO OR SPOT	SURFACE TYPE
		7D15	PCC PAVEMENT CLEANING AND SEALING OF HOT-POUR AND SILICON JOINTS	GALLONS	S.A. CONCRETE	FROM/TO OR SPOT	SURFACE TYPE
		7D19	PCC PAVEMENT BITUMINOUS PATCHING	TONS	S.A. CONCRETE	FROM/TO OR SPOT	SURFACE TYPE
		7M54	CONTRACTUAL CONCRETE PAVEMENT	DOLLARS	100 DOLLARS	FROM/TO OR SPOT	ROAD SECTIONS
NON-HARD SURFACE MAINTENANCE	3 A 1	7D30	NON-HARD SHOULDER MAINTENANCE (SPECIAL)	1/10 OF MILES	MILES N-H SHLDR	FROM/TO OR SPOT	SHOULDERS
		7M55	CONTRACTUAL NON HARD SURFACE	DOLLARS	100 DOLLARS	FROM/TO OR SPOT	ROAD SECTIONS
		7S22	NON-HARD SURFACE ROAD MAINTENANCE	ROAD MILES	MILES N-H ROAD	FROM/TO OR SPOT	SHOULDERS
		7S28	NON-HARD SHOULDER MAINTENANCE	10THS OF A MILE	MILES N-H SHLDR	FROM/TO OR SPOT	SHOULDERS
	3 A 2	7M74	CONTRACTUAL CURB & GUTTER	DOLLARS	DOLLAR	FROM/TO OR SPOT	ROAD SECTIONS
		7S43	MAINTENANCE AND REPLACEMENT OF CURB AND GUTTER	LINEAL FT	MILES CURB	FROM/TO OR SPOT	SHOULDERS
ROADSIDE MAINTENANCE	4 A 1	7M56	CONTRACTUAL LITTER PICKUP	DOLLARS	DOLLARS	FROM/TO OR SPOT	ROAD SECTIONS
		7M57	CONTRACTUAL CARCASS REMOVAL	DOLLARS	DOLLARS	NONE	ROAD SECTIONS
		7S38	ADOPT-A-HIGHWAY	LITTER MILES	LITTER MILES	FROM/TO OR SPOT	LITTER PICKUP
		7S39	LITTER CONTROL	LITTER MILES	LITTER MILES	FROM/TO OR SPOT	LITTER PICKUP
		7S45	SPOT LITTER & CARCASS REMOVAL	MAN-HOURS	MGMT UNIT	FROM/TO OR SPOT	LITTER PICKUP
	4 A 2	7M58	CONTRACTUAL FENCE REPAIR	DOLLARS	DOLLARS	FROM/TO OR SPOT	ROAD SECTIONS
		7S44	FENCE MAINTENANCE AND REPAIR	FEET R/W FENCE	MI R/W FENCE	FROM/TO OR SPOT	FENCES
	4 A 3	7M59	CONTRACTUAL ROCK REMOVAL	DOLLARS	DOLLARS	FROM/TO OR SPOT	ROAD SECTIONS
		7S54	ROCK REMOVAL	MAN-HOURS	MI CUT DITCH	FROM/TO OR SPOT	CUT DITCH
VEGETATION CONTROL	5 A 1	7D34	VEGETATION CONTROL (CHEMICAL)	ACRES	ACRES	FROM/TO OR SPOT	VEG. MGMT
		7M61	CONTRACTUAL VEGETATION - CHEMICAL	ACRES	ACRES	FROM/TO OR SPOT	VEG. MGMT
	5 A 2	7D35	BRUSH CUTTING & TREE REMOVAL	LIN FT	SHOULDER FEET	FROM/TO OR SPOT	VEG. MGMT
		7M76	CONTRACTUAL BRUSH & TREE REMOVAL	DOLLARS	DOLLARS	FROM/TO OR SPOT	VEG. MGMT
		7S33	VEGETATION CONTROL (OTHER)	MAN-HOURS	MGMT UNIT	FROM/TO OR SPOT	VEG. MGMT
	5 A 3	7M77	CONTRACTUAL MOWING	DOLLARS	DOLLARS	FROM/TO	MOWABLE AREA
		7S32	MOWING	ACRES MOWED	ACRES MOWED	FROM/TO	MOWABLE AREA
	5 A 4	7M12	VEGETATION MANAGEMENT	MAN-HOURS	MGMT UNIT	FROM/TO OR SPOT	VEG. MGMT
	5 B 1	7S42	ROADSIDE LANDSCAPE MAINTENANCE	MAN-HOURS	MGMT UNIT	FROM/TO OR SPOT	VEG. MGMT
DRAINAGE AND SLOPE REPAIR	6 A 1	7D58	DETENTION POND/BASIN MAINTENANCE	# DRAINS	# DRAINS	FROM/TO OR SPOT	DRAINAGE
		7S46	PAVED/CONCRETE DITCH MAINTENANCE	FEET PAVED DITCH	MI PAV DITCH	FROM/TO OR SPOT	CUT DITCH
		7S52	CUT DITCHES, CLEAN & RESHAPE	10TH MI CUT DITCH	MI CUT DITCH	FROM/TO OR SPOT	CUT DITCH
		7S53	CANYON CUT DITCH CLEANING	CU YDS	MI CUT DITCH	FROM/TO OR SPOT	CUT DITCH
		7S56	OPEN SURFACE DRAINAGE MAINTENANCE	CU YDS	MGMT UNIT	FROM/TO OR SPOT	DRAINAGE
	6 A 2	7D61	SPECIAL DRAINAGE (Hydro-Vacuum)	# DRAINS/CULVERTS	# DRAINS	FROM/TO OR SPOT	DRAINAGE
		7M62	CONTRACTUAL DRAINAGE PROGRAM	DOLLARS	DOLLARS	FROM/TO OR SPOT	ROAD SECTIONS
		7S51	DRAINAGE PROGRAM MAINTENANCE	DRAIN INSTALL.	# DRAINS	FROM/TO OR SPOT	DRAINAGE
	6 B 1	7M63	CONTRACTUAL EROSION REPAIR	DOLLARS	100 DOLLARS	FROM/TO OR SPOT	ROAD SECTIONS
		7S55	EROSION REPAIR	EACH	MGMT UNIT	FROM/TO OR SPOT	DRAINAGE
		7S84	FLOODS AND LANDSLIDES	MAN-HOURS	MGMT UNIT	FROM/TO OR SPOT	CUT DITCH

DESC.	BUDGET CATEGORY	ACT	DESCRIPTION	ACCOMP UNIT	INV UNIT	LOCATION	ASSET TYPE
MAJOR STRUCTURE MAINTENANCE	7 A 0	7M64	CONTRACTUAL STRUCTURE MAINT	DOLLARS	DOLLARS	FROM/TO OR SPOT	ROAD SECTIONS
	7 A 1	7D62	STRUCTURE MAINTENANCE/REPAIR	# STRUCT	# STRUCT	FROM/TO OR SPOT	STRUCTURES
		7D60	STRUCTURE INSPECTION	STRUCT INSTALL.	# STRUCT	FROM/TO OR SPOT	CATTLE GUARD
	7 A 2	7M78	CONTRACTUAL GRAFFITI REMOVAL	DOLLARS	100 DOLLARS	FROM/TO OR SPOT	STRUCTURES
		7S58	GRAFFITI REMOVAL	MAN-HOURS	MGMT UNIT	FROM/TO OR SPOT	CATTLE GUARD
	7 A 3	7D47	CATTLE GUARD MAINTENANCE AND REPAIR	#GUARDS	# CATTLE GUARDS	FROM/TO OR SPOT	CATTLE GUARD
TRAFFIC SERVICES	8 A 0	7S49	MAINTAIN TRUCK RUNAWAY LANES	# OF LANES	# OF LANES	FROM/TO OR SPOT	ROAD SECTIONS
	8 A 1	7D70	EPOXY STRIPING	GALLONS	4 INCH MILES	FROM/TO	PAVE STRIPING
		7D71	PAVEMENT STRIPING	GALLONS	4 INCH MILES	FROM/TO	PAVE STRIPING
		7D74	GUIDELINE (REMOVAL)	LIN FT	LANE MILES	FROM/TO	PAVE STRIPING
		7M65	CONTRACTUAL PAVEMENT STRIPING	DOLLARS	DOLLARS	FROM/TO	ROAD SECTIONS
	8 A 2	7D69	PAINTING TRAFFIC ISLANDS/PARKING LOTS	GALLONS	SURF AREA	FROM/TO OR SPOT	PAVE MESSAGE
		7D72	PAVEMENT MESSAGES MAINTENANCE	#LTRS/SYMBOLS/LINES	#LTRS/SYMBOLS/	FROM/TO OR SPOT	PAVE MESSAGE
		7M66	CONTRACTUAL PVMT MESSAGES	DOLLARS	DOLLARS	FROM/TO OR SPOT	ROAD SECTIONS
	8 A 3	7D73	NEW SIGN INSTALLATION	INSTALLATIONS/DAY	# NEW SIGNS	FROM/TO OR SPOT	SIGNS
		7D78	INTERSTATE SIGN RENOVATION MAINTENANCE	# INSTALLATIONS	#SIGNS	FROM/TO OR SPOT	SIGNS
		7M67	CONTRACTUAL SIGN MAINTENANCE	# INSTALLATIONS	DOLLARS	FROM/TO OR SPOT	ROAD SECTIONS
		7S63	SIGN AND POST INSPECTION (ANNUAL)	# SIGNS	# SIGNS	FROM/TO OR SPOT	SIGNS
		7S64	SIGN AND POST MAINTENANCE (ROUTINE)	# INSTALLATIONS	# SIGNS	FROM/TO OR SPOT	SIGNS
		7S65	SIGN VANDALISM REPAIR	# INSTALLATIONS	# SIGNS	FROM/TO OR SPOT	SIGNS
	8 A 4	7S68	DELINEATOR POST AND REFLECTOR MAINTENANCE	# DELINEATORS	# DELIN	FROM/TO OR SPOT	ROAD SECTIONS
	8 A 5	7D77	ATTENUATOR INSPECTION AND REPAIR	# ATTENUATORS	# ATTENUATOR	FROM/TO OR SPOT	ROAD SECTIONS
		7M68	CONTRACTUAL ATTENUATOR & GUARDRAIL MAINT	DOLLARS	DOLLARS	FROM/TO OR SPOT	ROAD SECTIONS
		7S41	NOISE WALL MAINTENANCE	SECTION/DAY	MGMT UNIT	FROM/TO OR SPOT	WALLS
		7S66	GUARDRAIL MAINTENANCE	LIN FT	LIN FT/100	FROM/TO OR SPOT	GUARDRAIL / CONC BARRIER
		7S70	CABLE BARRIER	LIN FT	LIN FT/100	FROM/TO OR SPOT	GUARDRAIL / CONC BARRIER
		7S71	CONCRETE BARRIER MAINTENANCE	LIN FT	MILES	FROM/TO OR SPOT	GUARDRAIL / CONC BARRIER
		7S72	GLARE SCREEN MAINTENANCE	LIN FT	MILES OF GLARE	FROM/TO OR SPOT	ROAD SECTIONS
	8 A 6	7D79	HIGHWAY LIGHTS MAINTENANCE	MAN-HOURS	# INSTALLS	NONE	ROAD SECTIONS
		7M10	CONTRACTUAL LIGHTING REPAIR	DOLLARS	DOLLARS	NONE	ROAD SECTIONS
	8 A 7	7D75	TRAFFIC SIGNAL MAINTENANCE	MAN-HOURS	# INSTALLS	NONE	SIGNALS
		7D76	TRAFFIC SERVICE MAINTENANCE (SPECIAL)	MAN-HOURS	MGMT UNIT	NONE	SIGNALS
		7D80	ATMS MAINTENANCE	MAN-HOURS	MGMT UNIT	NONE	SIGNALS
		7M69	CONTRACTUAL SIGNAL REPAIR	DOLLARS	DOLLARS	NONE	ROAD SECTIONS
	8 A 8	7M70	CONTRACTUAL SWEEPING	DOLLARS	DOLLARS	FROM/TO OR SPOT	ROAD SECTIONS
		7S69	SWEEPING	MAN-HOURS	MGMT UNIT	FROM/TO	ROAD SECTIONS
	8 A 9	7M71	CONTRACTUAL ISLAND MAINTENANCE	DOLLARS	DOLLARS	FROM/TO OR SPOT	ROAD SECTIONS
		7S67	TRAFFIC ISLAND MAINTENANCE	MAN-HOURS	# ISLAND	FROM/TO OR SPOT	TRAFFIC ISLAND
SUPPORT	9 A 1	7M92	STATION TRAINING	MAN-HOURS	MGMT UNIT	NONE	ROAD SECTIONS
	9 B 1	7FIX	FIXED EQUIPMENT COSTS	DOLLARS	MGMT UNIT	NONE	ROAD SECTIONS
		7D84	FERRY MAINTENANCE	MAN-HOURS	MGMT UNIT	MGMT UNIT	ROAD SECTIONS
		7L01	LEAVE	MAN-HOURS	MGMT UNIT	NONE	ROAD SECTIONS
		7M01	ACCOUNTS RECEIVABLE	MAN-HOURS	MGMT UNIT	NONE	ROAD SECTIONS
		7M02	FEDERAL CONST BY MAINT FORCES	MAN-HOURS	MGMT UNIT	NONE	ROAD SECTIONS
		7M03	RECOVERABLE ACCIDENTS	MAN-HOURS	MGMT UNIT	NONE	ROAD SECTIONS
		7M05	BLOCK GRANTS	MAN-HOURS	MGMT UNIT	FROM/TO OR SPOT	ROAD SECTIONS
		7M07	NON-BILLABLE ACCIDENT RESPONSE	MAN-HOURS	MGMT UNIT	NONE	ROAD SECTIONS
		7M08	BETTERMENT (OTHER THAN PAVEMENT)	MAN-HOURS	MGMT UNIT	FROM/TO OR SPOT	ROAD SECTIONS
		7M09	NON-RECOVERABLE ACCIDENTS	MAN-HOURS	MGMT UNIT	NONE	ROAD SECTIONS
		7M11	STATE CONST BY MAINT FORCES	MAN-HOURS	MGMT UNIT	NONE	ROAD SECTIONS
		7M15	CLEARING ACCOUNT	MAN-HOURS	MGMT UNIT	NONE	ROAD SECTIONS
		7M30	MMQA+ MEASURES	MAN-HOURS	MGMT UNIT	NONE	ROAD SECTIONS
		7M60	CONTINGENCY FUNDS	DOLLARS	DOLLARS	NONE	ROAD SECTIONS
		7M72	CONTRACTUAL STATION & YARD MAINTENANCE	DOLLARS	DOLLARS	NONE	ROAD SECTIONS
		7M73	CONTRACTUAL LAKE POWELL FERRY MAINTENANCE	DOLLARS	DOLLARS	NONE	ROAD SECTIONS
		7M80	LANDS & BLDGS (USE REGION L & B UNIT'S FOR ALL COSTS)	MAN-HOURS	MGMT UNIT	NONE	ROAD SECTIONS
		7M87	STATION BUILDING MAINTENANCE	MAN-HOURS	MGMT UNIT	NONE	ROAD SECTIONS
		7M88	SAFETY EQUIPMENT, CLOTHING & ETC.	DOLLARS	DOLLARS	NONE	ROAD SECTIONS
		7M89	STATION DRIVEWAYS, LOTS, AND YARDS MAINTENANCE	MAN-HOURS	MGMT UNIT	NONE	ROAD SECTIONS
		7M90	STATION SUPPLIES AND SERVICE	DOLLARS	DOLLARS	NONE	ROAD SECTIONS
		7M91	STATION GENERAL ACTIVITIES (OTHER)	MAN-HOURS	MGMT UNIT	NONE	ROAD SECTIONS
		7M93	STATION UTILITY SERVICES	DOLLARS	DOLLARS	NONE	ROAD SECTIONS
		7M99	STOCKPILING	MAN-HOURS	CUBIC YARD	NONE	ROAD SECTIONS
		8M02	PROJECT INSP & MATERIAL TESTING	MAN-HOURS	MGMT UNIT	NONE	ROAD SECTIONS
	9 C 1	7M86	STATION ADMINISTRATION	MAN-HOURS	MGMT UNITS	NONE	ROAD SECTIONS
		7G99	HEALTHY UTAH	MAN-HOURS	MGMT UNITS	NONE	ROAD SECTIONS
REST AREA	10 A 1	7S40	REST AREA MAINTENANCE	REST AREA	REST AREA	NONE	OTHER FACILITIES
		7M75	CONTRACTUAL REST AREA MAINTENANCE	DOLLAR	DOLLAR	NONE	

7. Other Budgets:

A tracking system is required for the budget for Engineer for Maintenance (EFM) and Methods Studies. Right now this budget is tracked on a spreadsheet. To be able to track this budget in the same way a station tracks its budget would be beneficial. This would give UDOT the ability to see the complete Code One budget in one place. The EFM and Methods budget also contains function numbers. Function numbers are numbers used by the state financial system to track certain costs. A desirable part of this budget would be the ability to assign a function number. If the system cannot provide this function, there still needs to be a placeholder and a way to manually assign the function numbers.

A budget is also provided for the Facilities that UDOT maintains. These budgets would need to be tracked. More discussion is provided regarding Facilities in the Feature Inventory discussion below. There is also a budget for Rest Areas and Lands and Buildings. These must also be tracked in the new System.

To summarize, ultimately the UDOT Code One budget as a whole is divided into the following working budgets, all of which are managed individually:

- Region 1
- Region 2
- Region 3
- Region 4
- Engineer for Maintenance Budget, comprising:
    - Methods Studies
    - Lands and Buildings (including Facilities Improvements)
    - Rest Areas
    - Other, including emergency and snow reserve

Other Business Processes

8. Three Year Plan:

The four Regions use a tool known as the Three Year Plan, which provides a means to identify projects beyond the scope of a normal station budget. For each station, the result is an Ongoing Station Project List. These types of projects are more expensive projects that a station budget cannot support. These types of projects may be sidewalk, widening, drainage, etc. These projects generally are done through a procurement contract and require time, planning, and sufficient budget.

Funding for projects on the Three Year Plan could come from Region Contingency, Maintenance Spot Improvement, Safety Spot Improvement, Transportation Solutions, or other funds that may become available. This funding may also need to be tracked by other departments in UDOT, so interfaces with those programs are essential.

Required functionality would be to turn something in the Three Year Plan into a Work Order to have the work completed. Depending on the individual creating the Work Order, it could also have different funding sources for approval.

9. **FINET**:

FINET is the State of Utah's financial reporting and analysis system. There needs to be an interface with FINET (see Section Seven for phases of FINET interaction) to bring in actual expenditures. There needs to be the ability to report and

analyze these numbers. To have the ability to see the Finet numbers and then add in the potential System numbers that have not hit actual Finet would be a huge benefit. For example, because labor costs reported in the MMS through the work order process are not reflected in Finet until after payroll is processed, it can take two or three weeks from the time the labor cost is entered in the MMS (via the completion of a work order) to the time it appears as a cost in Finet. Having the ability to see what has been charged in the MMS , combined with the information already in Finet, would give us a more up to date picture of our budget status.

10. **Maintenance activities standards**

Maintenance work at UDOT is accomplished by the means of over 140 defined “work activities”. Each work activity is described by means of an “activity standard”. The activity standard describes the expected labor, equipment, and materials necessary to accomplish a given unit of output (called the “accomplishment”). Well defined activity standards therefore allow UDOT analysts to predict the expected cost per accomplishment unit for any activity. The activity standard also describes what time of year is appropriate for each activity, and defines the steps normally used in order to achieve the desired quality of work. An activity standard is the result of analysis of work that has already been done by a station. This analysis includes the labor, equipment, and material, and the accomplishment achieved. In order to establish an activity standard, there needs to be history of the activity. At that point an analysis is done on the data to determine an average cost of labor, equipment and material. This analysis helps us determine what is needed to complete the activity. It also gives us an average cost for that activity that the stations can use for planning purposes. This analysis can be done manually.

The activity standards should be done on three levels.

1. Statewide using all of the data statewide to come up with a statewide default activity standard.
2. Regionally using all of the data in the Region to come up with a region default activity standard.
3. Station level using all of the data for the specific station to come up with a station-specific activity standard.

UTAH DEPARTMENT OF TRANSPORTATION
MAINTENANCE DIVISION
ACTIVITY PERFORMANCE STANDARD

Work Activity:	7D07 - BITUMINOUS LANE AND/OR SHOULDER LEVELING			Activity ID:	7D07
MMQA Group:	2A1	Description:	Hard Surface Maintenance		

Work Description:

To apply a leveling course of bituminous mixed materials to restore profile and cross section to the pavement. Patches will generally be less than 1000 lineal feet per mile of roadway length. Overlays should be charged to 7M04 - Betterment (Overlay). Work performed by contract, where UDOT involvement is limited to project oversight, should be charged to 7M52 - Contractual Asphalt - Reactive. Removal of materials by grinding should be charged to 7D22 - Bituminous Planing.

Calendar:

Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun

Conditions for Scheduling:

Lane leveling should be performed when the roadway is dry, and air temperature in the shade and the roadway surface temperature are above 50 degrees F. (refer to UDOT Standard Specification, Section 02741, Hot Mix Asphalt (HMA).

Average Daily Production:	2800 - 5100	Accomplishment Unit:		Square Yards (SQYDS)*	
Grader	2800 SY	Asphalt Spreader	5100 SY	Paver	5000 SY

*Calculation: (Length Feet X Width Feet) / 9 = SY

Recommended Procedure:

1. Call Bluestakes 48 hours in advance if any excavation is required.
2. Notify local agencies and/or businesses.
3. Perform a project drive through to identify all aerial obstructions.
4. Mark all overhead utility crossings with a sign placed 50' on either side of the crossing.
5. Use a spotter when working in the overhead utility crossing zone.
6. Place safety devices and signs (See Standard Drawings).
7. Sweep surface area if required with power or hand broom.
8. Apply an evenly distributed tack coat or .04 to .10 gallons/square yard.
9. Spread material using a grader, spreader box, or laydown machine.
10. Roll material with steel-wheeled rollers.
11. Place temporary striping. (Refer to Section 7 for Temporary Striping)
12. Remove safety devices and signs.

Personnel	Qty.	Equipment	Qty.	Material	Code	UOM	Qty.
Roadway Operations Manager	1	0104 - Truck Tandem Axle SRE	4	Hot Plant Bituminous 9.5	74512150040	Ton	0.057
Transportation Technician I	1	0113 - Truck Triple Axle SRE	3	Liquid Asphalt CSS Con	74508151409	Gallon	0.04
Transportation Technician II	3	0201 - Truck 1 Ton Dual WHL CC	1				
Transportation Technician III	3	0501 - Grader/Standard	1	Miscellaneous Material:	$0.04	SQYD	
		1001 - Asphalt dist, trailer/600 gal	1	Shovels, rakes, work			
Note: Additional personnel needed for lay-		1804 - Roller, self prop, over 6 ton	1	signs, temporary paint			
down machine and spreader box operations.		1920 - Pickup 3/4-T Reg Cab	1	tabs, release agent, etc.			
		3503 - Platform Trailer/15 to 35 ton	1				
		3506 - Pup Trailer	2				
		Optional Equipment:					
		0210 - Truck 1 Ton Crew Cab Dum	*1*				
		0903 - Loader/FE 2-3 yards	*1*				
		2101 - Sweeper/Tow Type	*1*				
		3202 - Asphalt Spreader	*1*				
		3501 - Platform Trailer/up to 5 ton	*1*				

UTAH DEPARTMENT OF TRANSPORTATION
MAINTENANCE DIVISION
ACTIVITY PERFORMANCE STANDARD
(Continued)

Work Activity:	7D07 - BITUMINOUS LANE AND/OR SHOULDER LEVELING			Activity ID:	7D07
MMQA Group:	2A1	Description:	Hard Surface Maintenance		

Measure of Quality:

Critical Functions:

1. Budget must be generated at the station level and construction level and then build to a Region Level
2. Budgets must be distributed from Central and make their way down to stations
3. Each Fiscal year will include:
    a. Requested Budget
    b. Approved/Initial Budget
    c. Working Budget

4. System should include intuitive and interactive Business Intelligence tools to help all parties effectively manage their budget at a glance.
5. System must drill down into details from Finet and the system information that has not yet been pushed to Finet
6. System must incorporate both an initial budget as well as a Three-Year planning budget for larger projects.
7. The Facilities, Lands and Buildings, and Rest Area budgets must be tracked in the system.
8. A Pavement request and tracking budget must be included in the system.
    - A function of this is to assign function numbers to each project.
9. .
10. System must efficiently represent the Construction Field Crew Requests.
11. System must effectively manage the EFM and Methods project budget
12. System must interact with FINET (see Section Seven for phases of FINET interaction) to provide near real-time financial numbers and employee loaded rates.
    a. Budgets need to be displayed on activity screen (or other screens where applicable) when creating a work order or a work request so that the station supervisor can see what he has remaining in his budget to perform the work.

Mobile capabilities

None required for this Section.

Resource Documents for the Vendor/Proposer:

1. Activity group list
2. Budget spreadsheet
3. Construction Field crew requests
4. Description of how FiNET gets its info
5. EFM/Methods Spreadsheet
6. Activity standards
7. Activity performance standards

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Section Three: The ORGANIZING Functional Area

Overview:

The Organizing Business Processes module focuses on

1. Internal Resource Database
2. Workload Distribution Interface
3. Work Calendar

This module facilitates optimization of the Department's resources to organize and accomplish work as efficiently and economically as possible. By assigning unique identifiers to Department employees and Department-owned equipment, maintenance stations across the state can share and shift resources. Resources are assigned by work tasks utilizing an electronic Work Calendar that is unique to each maintenance station. Filters can be used to identify available resources based on work schedule availability and certifications that may be required for the planned tasks.

Key Functionality:

1. Internal Resources Database:

A searchable, intuitive, and interactive database of Department employees and Department-owned equipment that can be scheduled by unique identifiers with specific attributes is required of the new MMS program.

Required Functionality related to Internal Resources Database:

a. Schedulable personnel resources for Department Employees.
b. Schedulable equipment resources for Department-owned equipment.
c. Resources are assigned unique identifiers.
d. Resources are shared across the Department, but resources assigned to any given maintenance station are presented first in a short list.
e. Personnel resources have modifiable attributes for certifications, work restrictions, user costs, unavailability due to planned vacation or temporary assignment to construction, and additional customizable fields as needed.
f. Equipment resources have modifiable attributes for certifications, maintenance requirements, calibrations, user costs, and additional customizable fields as needed.
g. Station admin can easily add or edit resources.
h. Resources are scheduled by the day and cannot be double-booked.

2. Work Calendar:

A resource-loaded schedule that is used by station supervisors to perpetually plan work.

Required Functionality related to Work Calendar:

a. Planning unit is by hours.
b. Working days can be customized to work around holidays and other days when work cannot be accomplished, such as vacation and training days.
c. Can be modified to view in day, week or month mode

d. A unique Work Calendar is provided for each maintenance station. Can drag or stretch planned Maintenance Activities or Work Orders to modify start dates or durations.
    - Required automatic edit checks ensures resources are still available.
e. Stations may share view rights to their calendar with other stations, and other roles as desired by the station. These roles could include Area Supervisors, Maintenance Engineers, etc. The ability for a manager to see subordinates calendars without the subordinate, needs to be incorporated in the roles for the managers.
f. A Work Calendar is provided to construction engineers so they are able to reserve personnel resources for construction inspection.
g. As a result of all work being geo-referenced, the calendar can show planned activities within a defined time period on a map interface.
h. As a result of all work and resources being cost-loaded, the calendar can export anticipated expenditures within a defined time period. This cost loading comes from the activity standards.
i. In effort to manage overtime and budget, a warning system acknowledges when an employee resource is scheduled for more than 40 hours per week and also other incentive pay.
j. Generate and print customized schedules for individual personnel, equipment or crews.
k. Hours per day can be customized (usually 8 or 10).
l. A unique Work Calendar is provided for each piece of equipment that is populated by the work requests or work orders.
m. The calendars sync with Google Calendar.
n. Ability to track personnel and equipment resource allocation and productivity over defined time periods.

3. <u>Workload Distribution Interface:</u>

A navigable interface unique to each maintenance station that facilitates identifying and scheduling prioritized Work Requests, Work Orders and tasks.

<u>Required Functionality related to Workload Distribution Interface:</u>

a. Potentially shown as a widget at bottom or sides of the Work Calendar interface (see drawing at the end of this section)
b. Contains multiple tabs for these types of work:
    - Work Requests
    - Summer Task List
    - Winter Task List
    - Additional tabs as needed
c. Each tab contains a list of tasks that consists of Maintenance Activities.
    - The Task Lists are customizable by each station supervisor.
    - The Maintenance Activities can be generated in several different ways:
        - The supervisor generates repeatable tasks based on common activities needed in that maintenance boundary.
        - Rainy day type tasks -
    - Maintenance Activities would not disappear off the task lists like Work Orders because they are repeatable tasks that are used often.
    - The Maintenance Activities contain attributes for personnel, costs, equipment, duration, location, materials, coordinating entities and additional customizable fields as needed.
d. The Work Request tab also contains Work Orders.
    - Work Orders can be generated in several ways:
        - Are created internally for routine maintenance activities and betterments.
        - Are generated from Work Requests originating from Click n Fix.
        - Are generated from the mobile UI as pinpointed repair work is identified in the field.

        - Can be created by other entities within the Department such as Structures, Asset Management and Safety as they identify repair work needs.
        - After-the-fact emergency work.
    - The Work Orders contain attributes for personnel, costs, equipment, duration, location, materials, coordinating entities and additional customizable fields as needed.

e. Using the Workload Distribution Widget GUI:
    - The Station Supervisor navigates to the Maintenance Activity or Work Order that they desire to schedule, and then drag and drop that activity onto the calendar for scheduling.
    - The interface prompts for personnel and equipment resources to be assigned to the work. They can be picked from an intuitive list so that the resources most commonly used by the station for this activity first pull up from the Internal Resources Database. This will make the list of resources much shorter and more easily used on a tablet or phone.
    - Filters are used to show available resources based on where in the calendar the Maintenance Activity or Work Order was dropped.
    - Options will allow for recurrent scheduling at regular intervals.
    - Material needs and costs are entered - Inventory materials are selected from an intuitive list so that only the inventory that is generally used and available by this station pulls up. There would still need to be a way to look at the complete list also.
    - Costs for subcontractors are entered.
    - If plans drastically change, the Maintenance Activity or Work Order can be dragged off the calendar view and restored to the Workload Distribution Widget.

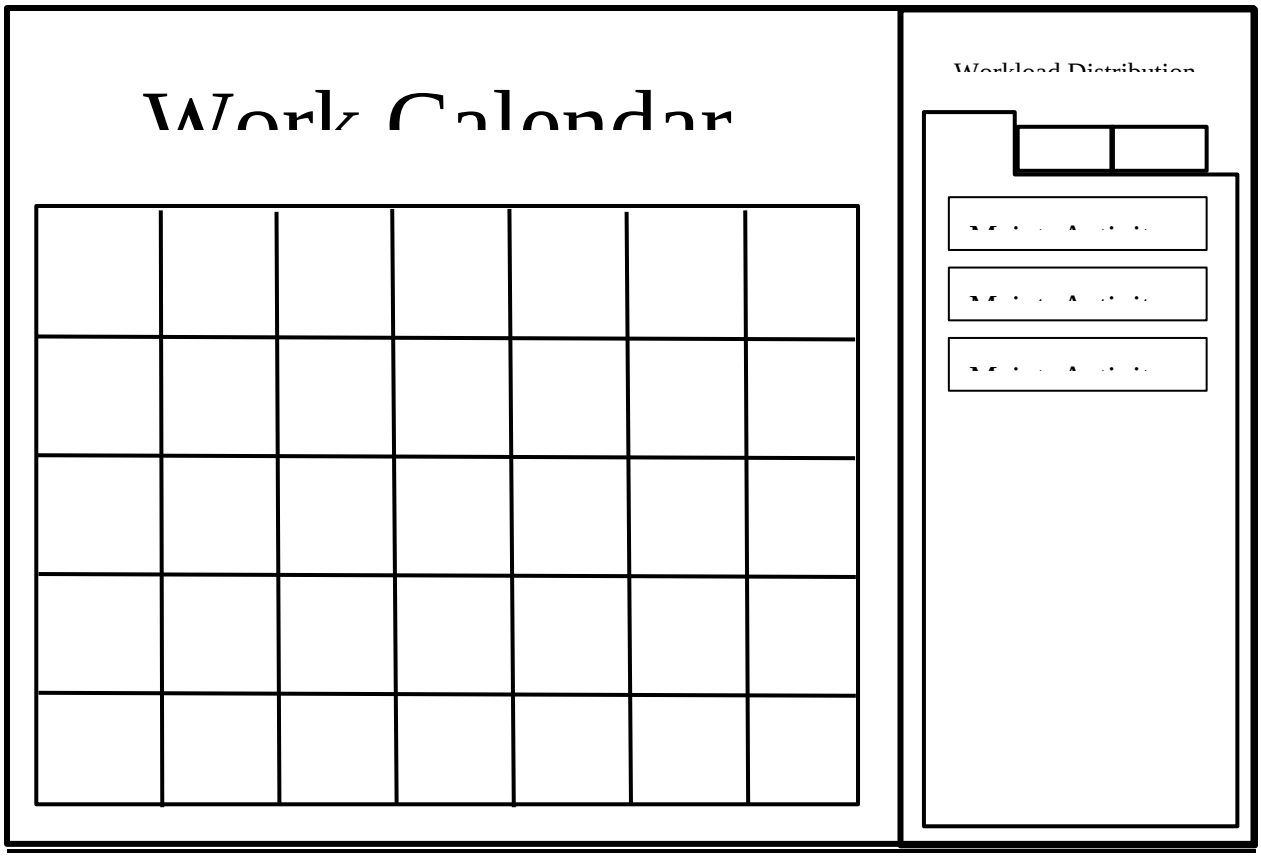
4. Mobile capabilities for Organizing Business Processes

- Desire to have as much functionality available as possible

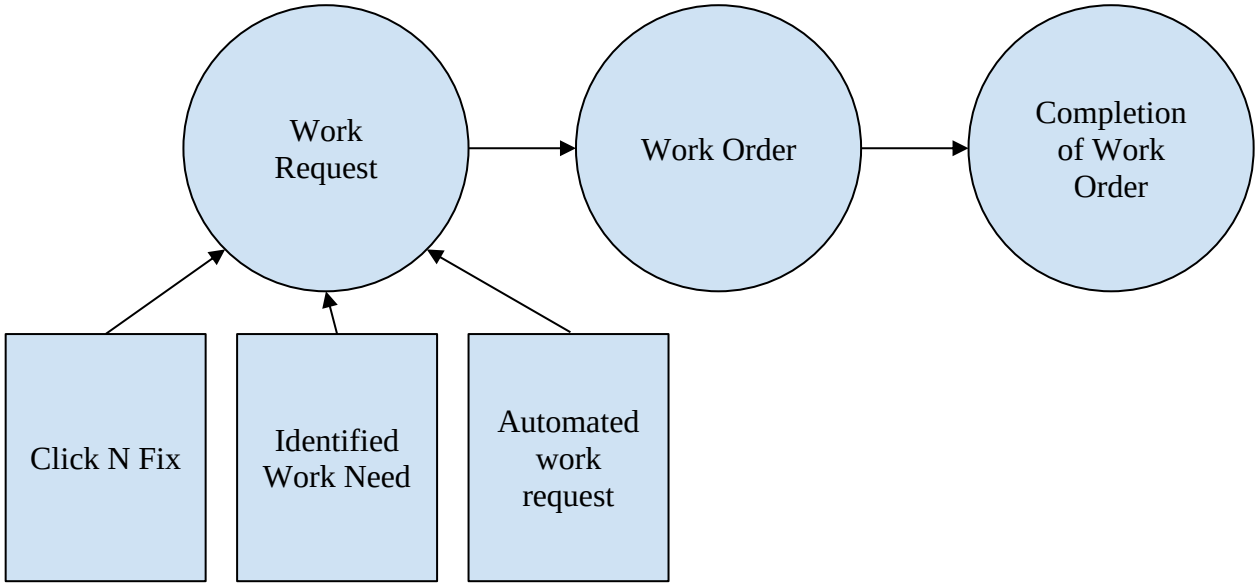
5. Spatial capabilities for Organizing Business Processes

- Planned activities show on a map that can be used to see what is planned in that area.

6. Resource Documents for the Vendor/Proposer:


Work Calendar
Workload Distribution

Section Four: The DIRECTING Functional Area



Overview:

All of this section is a required function

The Department's workflow for directing begins with a "Work Request" which is an initial identified work need which can be created within the maintenance management system, as an automated work request, or on our Click N Fix App.

Certain activities that are more routine may begin as a Work Order skipping the work request process.

The "Work Requests" will then become a Work Order once the Station Supervisor has recognized the work request and has assigned an activity/activities to it and made a plan to execute the identified work need. The work order or work request shall be able to be moved into a daily, weekly, biweekly, or monthly interactive work calendar to which you will also be able to add resources .

Some work orders will be automated. Automated work orders will be assigned to specific units with varying activities such as facility maintenance, stormwater inspections, or fire suppression inspections, etc. on an adjustable or fixed schedule (quarterly, annually, etc…).

In completion or approval of the Work Order, the process will be confirming the resources used to complete and process a payroll entry, an inventory use, or other items that must be recorded. The user will be able to enter work request or work order information while in the field using responsive design, whether or not the mobile device is connected to the internet.

1. **Work Request:**

Work requests shall be capable of being created from a mobile capability to include photos, mapping locations (polygon lines) to describe work area, and the capability to include identified assets. Work Request should be able to be scheduled on the calendar before they are turned into work orders in order to plan in advance.

Work requests must consist of the following information:

a. Asset or multiple assets if required by activity.
b. Activity or activity group
c. Date created
d. Who created and how to reply
e. Location of assets or marked areas on mapping feature
f. Priority (Safety Sensitive, Risk based)
g. Photos section
h. Description section
i. Items needed to repair section

All of these items are not required to be filled out the user, but they must be available so that we can obtain as much information as possible. The majority of the information will be required for the work order so to have it completed in this step versus having to do it again in the work order process will save time for the end user.

2. Work Order:

In this process the Work Order is recognized, scheduled, and sent to the individuals and/or contractor that will be responsible for executing the work. Work Orders for contractors may result in a Purchase Order. Work Orders must have the capability of tracking multiple work requests and or multiple assets and activities on a single work order. This option allows for one work order to be completed for multiple work requests so that it saves time for the end user and allows them to document all work that has been done.

Work Orders must consist of the following information:

a. Asset or multiply assets if required by activity and the completed work order will update the condition of the assets that were repaired or worked on, and update the performance report accordingly. Additionally the completed work order will update the asset inventory, including attributes of assets repaired or replaced. Activity
b. Unit / Org
c. Date and time created
d. Who created
e. Edit tracking and communicate back to initiator that the work was completed (i.e. mark work request complete, send “issue resolved” message back to Click-and-Fix, etc.)
f. Employees working on the work order. Use the correct payroll time code (e.g. regular pay, overtime, differential pay, etc.) based on parameters supplied by UDOT. Translate labor used in the performance of the work into time records for each individual, to be used in payroll
g. Location of asset or marked area on mapping feature, use a map interface to allow the user to record the work location and/or specific asset being worked on.
h. Priority (Safety Sensitive, Risk based)
i. Photos section
j. Description section
k. Items needed to repair section (material), Update materials inventory as a result of materials used in performing the work
l. Selected equipment to be used. Pass equipment usage information to Fleet Management database.
m. Selected personnel to be used
n. Duration (hours)
o. Accomplishment amount
p. Coding info needed for Finet (function, program, phase, agency, object code, etc.)
q. Record work done by contract if applicable.
r. Show total cost of performing the work done. Differentiate between the total cost of work performed when completed by a contractor (contract) versus when the worked is completed by UDOT staff.

All of these items are not required to be filled out by the user, but they must be available so that we can obtain as much information as possible. The majority of the information will be required for the work order to be processed.

3. Completion of Work Order:

Completion or approval of the Work Order is the process that may consist of confirming or changing the collected information on the Work Order process. Once information is confirmed correct by the Station Supervisor or Designated Station Leads (Assistant Supervisor) this completion process then generates payroll.

a. From the completed work orders, this would then generate the employee's payroll that could be electronically signed by both the employee and the supervisor. This would then interface with Finet to provide the employee's hours for payroll.

Mobile capabilities for Organizing Business Processes

- All functional requirements as described above
- Ability to see budget for the activity that the work order is assigned to.

Spatial capabilities for Organizing Business Processes

- All functional requirements as described above

Section Five: The MANAGING AND ANALYSIS Functional Area

Overview:

The Managing and Analysis business process area includes functionalities within the maintenance management system that support the following:

1. Performance and cost reporting
2. Field performance evaluation
3. Analysis and management action
4. Updating of planning values which feed the Planning and Budgeting business process area.

When maintenance work is performed, either by UDOT staff or by hired contractors, the maintenance management system allows the work to be recorded, including the labor, equipment, and materials used and the accomplishment achieved. In the case of contracted work, although the labor, equipment, and material used may not be recorded, the cost of the work, along with the accomplishment, is recorded.

Using the data, local managers can immediately understand where process improvements can be made to improve efficiency, and where resources can be shifted from one activity to another in order to meet performance targets in all areas as priorities dictate and resources allow.

The reporting of the work done enables UDOT analysts to report to state government leaders and to the taxpaying public in terms of accomplishment, resulting infrastructure condition, and cost. The data can be used to explore areas where efficiency can be improved, and to update values used for planning and budgeting, including the condition of physical assets and the activity standards that govern their maintenance.

Key Functionality:

1. Performance and Cost Reporting:

When work has been performed, the system will be able to supply the user with detailed information regarding the cost of the work done, (labor, equipment, material, contract costs), and the result achieved (accomplishment, or improvement).

Work may be done in the form of 1) repairs/maintenance of individual assets (e.g. signs), 2) repairs/maintenance of classes of assets (e.g. delineators) for which less detail is needed, or 3) services performed which do not impact the condition of physical features (e.g. snow removal, litter pickup, weed control).

The system should be able to report cost and performance in terms that can be used by all three forms. In each case, translate the accomplishment into a performance metric that can be used to a) report on our accountability to UDOT senior leaders, commissioners and legislators, and the public, b) enable course corrections, process improvements, or resource reallocation, c) predict the cost to achieve a given level of service, and d) provide reports on assets, i.e.: how many times it has been repaired, damaged, etc. so we can analyze the lifecycle of an asset and the location.

Required Functionality Related to Performance and Reporting:

a. The system reports performance based upon the work accomplished, in combination with methods of condition assessment that don't require extensive use of manual surveys or visual, subjective observations.
b. The system supports a Performance Based model for maintenance management, including asset inventory, condition assessment techniques, risk management, performance standards, and performance metrics.

c. The system supports Performance Based Maintenance Contracting, allowing the Department to use the system to manage work performed by contractors under performance based contracts, employing the same measures and reporting tools as for agency-performed work.

2. Field Performance Evaluation:

Once all this information is collected, having the ability to query any portion of the database, at any detail and view it in charts and graphs will reveal trends, show areas of improvement and areas needing more attention, and will help managers make informed decisions when adjusting the work program at either a crew, region, or statewide level.

Required Functionality Related to Field Performance Evaluation:

a. The system should provide the ability to evaluate how work is being accomplished in the field compared to any part of the Activity Standard. This information will be used in adjusting the activity standards as necessary, at UDOT's discretion (not automatically).
b. The system should provide the capability of using performance standards to evaluate the comparative efficiency, productivity and cost-effectiveness of various work procedures, equipment, material types and crew sizes.
c. The system should track, report, and maintain a history of field inspections including semi-annual inspections. The system should also track inspection due dates, date performed and the associated condition, status and comments.
d. The system should provide a suite of standard reports and graphs to help managers at all levels evaluate the performance of their crews. Such reports could include:
    - Expenditures vs. budget, including projected expenditures by year end, for the budget as a whole, and for major activities such as snow removal and hard surface maintenance
    - Expenditures vs. condition for various activities or activity groups (i.e. What outcome did we buy for our money?)
        - Snow removal cost per plow route, surface area, and lane miles.
        - Other areas as needed and determined at later dates.

3. Analysis and Management Action:

The ultimate purpose of a maintenance management system is to enable managers to improve the maintenance operation. This need exists at several levels, including the station level, the area level (a group of several stations), the region level, or statewide.

At each level, managers need access to information that is easy to consume and understand, and that informs decisions that could include redeployment of resources, redefining work priorities, identifying needed process improvements or training, adjustments to work schedules, and others. The system therefore needs to help us evaluate our work plan compared to our actual performance by activity, work crew or private contractor, expenditure, or performance standard.

Required Functionality Related to Analysis and Management Action:

a. Interface to the UDOT Socrata performance management dashboard so that managers can easily access important performance measures on the same platform as other UDOT measures.
b. Include standard reports, graphs, and analysis tools that enable effective decision making.
c. Include a capacity for customizing reports, graphs, and other analysis tools to meet local or regional needs.
d. Track spending throughout the fiscal year with simple visual comparisons to the amount budgeted (with projections of expected spending vs. budget), previous year's spending, and average year spending for the same activity or group of activities.

4. Pavement (Hard Surface) Maintenance Tracking Analysis and Reports

A special case of Performance and Cost Reporting relates to pavement (hard surface) maintenance. Some preventive pavement maintenance work, including seal coats and other similar treatments, is performed under UDOT's STIP process, financed by the construction line item (usually with federal funds). The same types of treatments are performed either by UDOT maintenance crews or by procurement contracts, financed by the operations (Code One) line item. In both cases, potential projects are identified by the Pavement Management System (dTIMS, a software licensed to UDOT by Deighton Associates, Ltd.), or by a combination of data from dTIMS and visual observations by maintenance and engineering staff. Pavement maintenance work performed by UDOT crews or by procurement contracts are tracked and managed purely within the maintenance management system.

Required Functionality Related Pavement (Hard Surface) Maintenance Tracking Analysis and Reports:

a. Provide ability to compare Hard Surface Activity totals (group 2 activities) with Maintenance Region Level FY budget requests, with the ability to verify whether the requests are in line with the totals.
b. Ensure reporting consistency between State, Region and Stations
c. Provide functionality for users to report Hard Surface Expenditures for Level I (high volume) and Level II (low volume) roads.
d. Communicate preventive pavement maintenance work performed to UDOT's pavement management system (dTIMS).

5. Updating of Planning Values:

To complete the maintenance management cycle, data recorded and developed using the functionality within the Managing and Analysis area are used to update values in the areas of planning, budgeting, organizing, and directing. Also, asset inventory is updated and a historic record is maintained, including presence of assets, attributes of those assets, and asset condition.

Data regarding labor and equipment used, and calculated productivity, can be used within the activity standards to more precisely plan future similar work, including calendaring, workload distribution, and resource requirements at a station level.

Required Functionality Related to Updating of Planning Values:

a. Update the feature inventory, including presence, and attributes.
b. Update the condition of each feature (or class of features) worked on.
c. Provide information to UDOT for effective decision making regarding updating the activity standard for each activity that was performed for:
    - Statewide
    - Regionally
    - Per station

Required mobile capabilities for Managing and Analysis

a. Ability to view assets to be worked on by means of a map interface
b. Ability to view materials inventories in real time or near real time
c. Perform all of the above functions while in the field, whether connected to the Internet or not.

Required spatial capabilities for Managing and Analysis

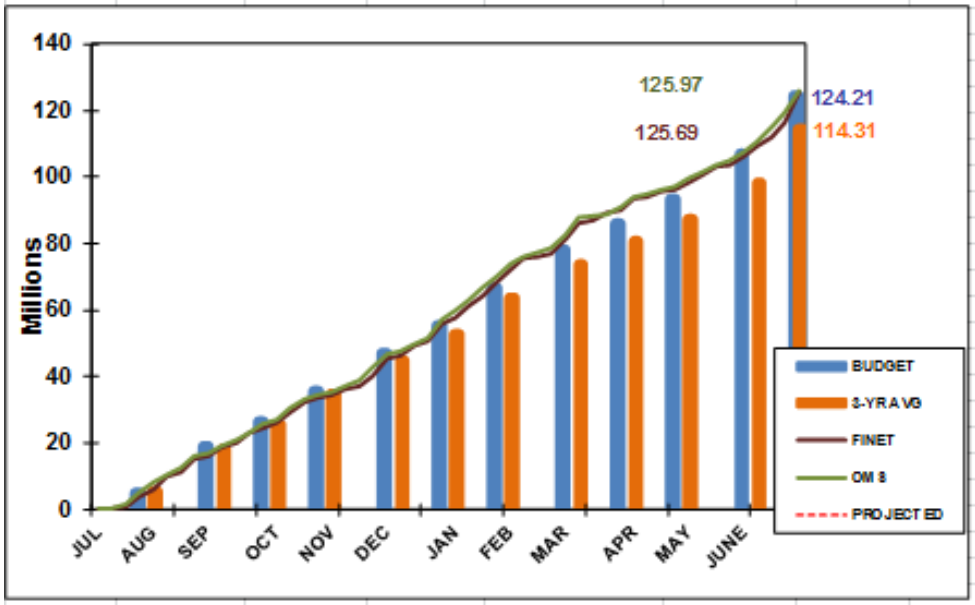
a. Ability to view maintenance costs by route segment, by group of selected route segments, or by area.
b. Ability to view assets to be worked on by means of a map interface.
c. Ability to track and review changes over time for temporal analysis

Analysis report to monitor budget.

Statewide

FY 2017 Code One Maint

Budget and 3-Yr Avg vs OMS, FINET and Projection



FIELD CREWS

BUDGET	ACTUAL	AVAILABLE
$13,168,658	$12,830,832	$337,826

TOTAL CODE ONE BUDGET:	$124,219,442

YTD CODE ONE BUDGET:	$124,219,442
OMS ACTUAL:	$125,976,873
FINET ACTUAL:	$125,696,647
PROJECTED BY FINET	$117,528,931
3-YEAR AVERAGE EXPENSES FINET	$114,316,842
PERCENT SPENT OMS VS TOTAL BUDGET	101.41%
PERCENT SPENT FINET vs TOTAL BUDGET	101.19%
VARIANCE FINET VS OMS	0.23%
<OVER> / UNDER FINET YTD	($1,477,205)
<OVER> / UNDER OMS TOTAL	($1,757,431)
<OVER> / UNDER FINET TOTAL	($1,477,205)

DATE OF REPORT September 14, 2017

Payroll posted through 7/31/17

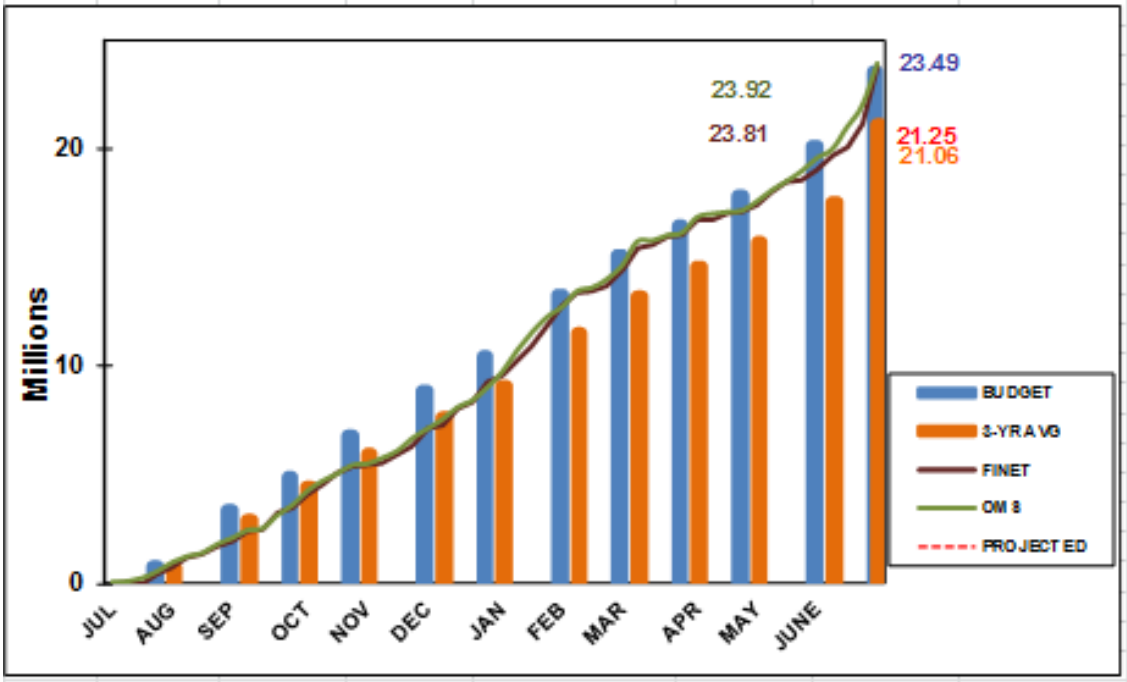
We have spent 81% of our budget for FY17. The total budget is $124.2 million and as of the payroll of May 5, 2017 and the current expenses as of May 17, 2017, we have spent $100.54 million. The three year average for this time of year is about 72% of the total budget, which is roughly $88.88 million.

Same report as above, except this one is at a region level.

Region One

FY 2017 Code One Maint

Budget and 3-Yr Avg vs OMS, FINET and Projection



FIELD CREWS		
BUDGET	ACTUAL	AVAILABLE
$2,291,386	$2,325,194	($33,808)

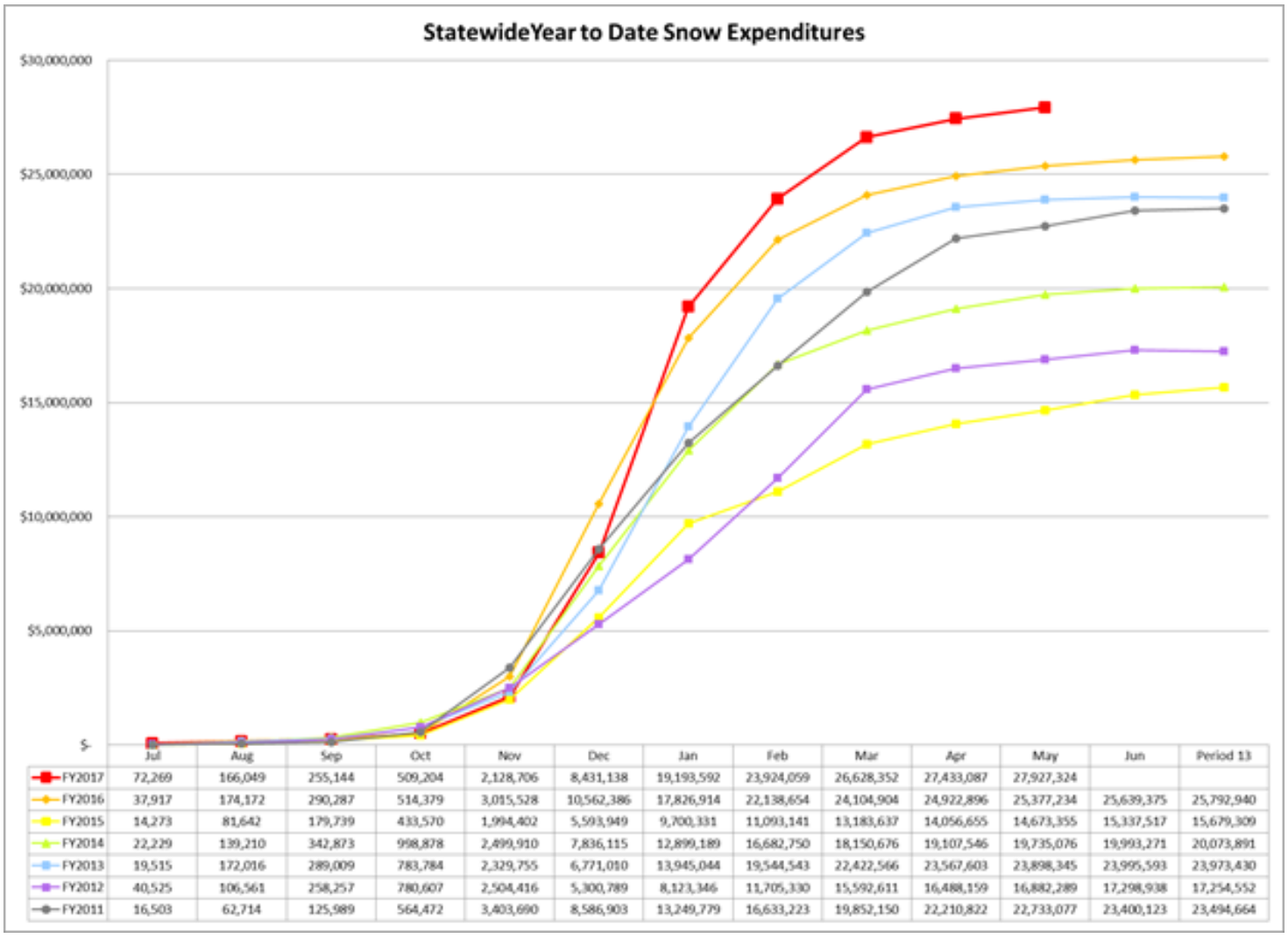
TOTAL CODE ONE BUDGET:	$23,499,908

YTD CODE ONE BUDGET:	$23,499,908
OMS ACTUAL:	$23,923,546
FINET ACTUAL:	$23,811,662
PROJECTED BY FINET	$21,255,213
3-YEAR AVERAGE EXPENSES FINET	$21,068,207
PERCENT SPENT OMS vs TOTAL BUDGET	101.80%
PERCENT SPENT FINET vs TOTAL BUDGET	101.33%
VARIANCE FINET VS OMS	0.48%
<OVER> / UNDER FINET YTD	($311,754)
<OVER> / UNDER OMS TOTAL	($423,638)
<OVER> / UNDER FINET TOTAL	($311,754)

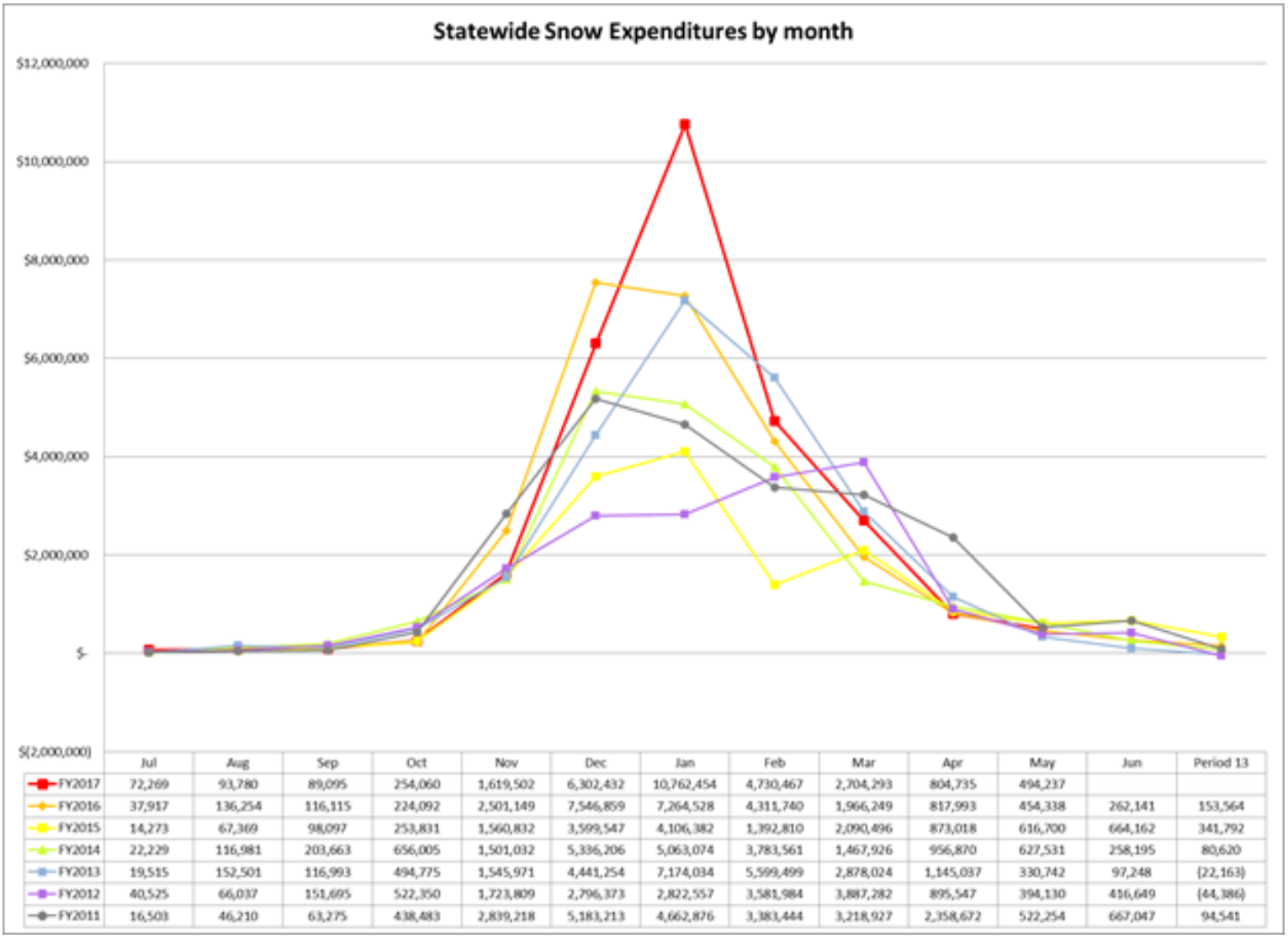
DATE OF REPORT September 14, 2017

Payroll posted through 7/31/17

Snow Expense statewide graph. This shows the expenses by year to date month for snow only. This has 7 years' worth of data.
Snow Expense Statewide year to date graph.



	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Period 13
FY2017	72,269	166,049	255,144	509,204	2,128,706	8,431,138	19,193,592	23,924,059	26,628,352	27,433,087	27,927,324		
FY2016	37,917	174,172	290,287	514,379	3,015,528	10,562,386	17,826,914	22,138,654	24,104,904	24,922,896	25,377,234	25,639,375	25,792,940
FY2015	14,273	81,642	179,739	433,570	1,994,402	5,593,949	9,700,331	11,093,141	13,183,637	14,056,655	14,673,355	15,337,517	15,679,309
FY2014	22,229	139,210	342,873	998,878	2,499,910	7,836,115	12,899,189	16,682,750	18,150,676	19,107,546	19,735,076	19,993,271	20,073,891
FY2013	19,515	172,016	289,009	783,784	2,329,755	6,771,010	13,945,044	19,544,543	22,422,566	23,567,603	23,898,345	23,995,593	23,973,430
FY2012	40,525	106,561	258,257	780,607	2,504,416	5,300,789	8,123,346	11,705,330	15,592,611	16,488,159	16,882,289	17,298,938	17,254,552
FY2011	16,503	62,714	125,989	564,472	3,403,690	8,586,903	13,249,779	16,633,223	19,852,150	22,210,822	22,733,077	23,400,123	23,494,664



	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Period 13
FY2017	72,269	93,780	89,095	254,060	1,619,502	6,302,432	10,762,454	4,730,467	2,704,293	804,735	494,237		
FY2016	37,917	136,254	116,115	224,092	2,501,149	7,546,859	7,264,528	4,311,740	1,966,249	817,993	454,338	262,141	153,564
FY2015	14,273	67,369	98,097	253,831	1,560,832	3,599,547	4,106,382	1,392,810	2,090,496	873,018	616,700	664,162	341,792
FY2014	22,229	116,981	203,663	656,005	1,501,032	5,336,206	5,063,074	3,783,561	1,467,926	956,870	627,531	258,195	80,620
FY2013	19,515	152,501	116,993	494,775	1,545,971	4,441,254	7,174,034	5,599,499	2,878,024	1,145,037	330,742	97,248	(22,163)
FY2012	40,525	66,037	151,695	522,350	1,723,809	2,796,373	2,822,557	3,581,984	3,887,282	895,547	394,130	416,649	(44,386)
FY2011	16,503	46,210	63,275	438,483	2,839,218	5,183,213	4,662,876	3,383,444	3,218,927	2,358,672	522,254	667,047	94,541

SECTION SIX: OTHER FUNCTIONALITY

Overview

UDOT is an innovative department. Part of innovation is always changing and evolving for the traveling public and legislatures to make sure we are providing the best service to our State. In this atmosphere we are always looking for innovative and new ideas to incorporate to make our jobs safer, less time consuming, more efficient, and money saving ideas. Having the ability to customize and develop other functions is essential to continue down this path.

In this section you will find other functionality that may be required in the system. We are already completing these tasks either in a spreadsheet, with notes, or other options and to have these tools accessible in one application for our employees would be very beneficial.

Listed below are some other functionality that we are requesting, but over time additional functionality may be required.

Spatial capabilities for Organizing Business Processes

- All functional requirements as described above

1. Storm Water Program:

UDOT is required to monitor and maintain certain storm water information. Part of this is extensive record keeping and inspections that are required of UDOT. Listed below are some of the requirements that are required now, but others may be needed in the future. This area needs to be highly adaptable and configurable by UDOT as laws and requirements are always changing.

1. Asset Database
    a. A single location such as a maintenance shed may have many different attributes such as:
    b. Retention
    c. Detention
    d. Outfalls
    e. Etc.
2. Inspection
    a. Weekly and quarterly inspections.
    b. Visual inspections during a rain event
    c. Incorporation with existing UPlan applications
        i. Need to read/write to current data
        ii. Multiple question survey forms. For example, if a person answers “yes” to a question, they get a different set of subsequent questions than if they had answered “no”.
3. Schedule/Tracking for regular inspections, cleaning, and repair of catch basins, storm water conveyance pipes, ditches and irrigation canals, culverts, structural stormwater controls, and structural runoff treatments and/or flow control facilities.
4. Incorporation of outside entity maintenance agreements for facilities that have been turned over to other entities.

Required Functionality related to Storm Water Program:

- Everything listed above in the Storm Water Program section

Mobile capabilities for Organizing Business Processes

- All functional requirements as described above

Spatial capabilities for Organizing Business Processes

- All functional requirements as described above

SECTION SEVEN: INTERFACES and SYSTEM REQUIREMENTS

Overview

Frequent interactions with other divisions within UDOT require the sharing of data. The Maintenance system must be able to efficiently share data with other UDOT systems abiding by business rules while taking great care to ensure data integrity.

The sections below are to provide information regarding business systems that the selected application would need to interact with. Information may flow one or both directions from these business systems.

UDOT business rules often require data to be analyzed, calculated or validated when data is shared between other systems or databases. The system must be flexible enough to accommodate database processes before importing, exporting or otherwise sharing data, meeting Maintenance and/or other UDOT application requirements. An example of this would be enforcing FINET coding block business requirements whenever coding block data elements are part of an interface.

This data validation takes place within the database at the table and/or record level. Ideally, the validation would be at the field or record level when the user is creating or updating data within a UI (User Interface) and the database serving as the next level of ensuring data integrity, particularly if data is created or modified from the back end or database side. An example of this would be when data is imported or when a system administrator accesses the data with a tool that interfaces with the data through a database connection.

With respect to the interfaces noted below that share data with the state of Utah's FINET system, we highly suggest the new system is capable of accomplishing the sharing of data in two different ways and in two phases. The high level description of the two phases are below:

- Phase I
    - As required by a given interface, produce an XML (Extensible Markup Language) file containing the related data elements, once the data has been evaluated and successfully passed the associated validation process, when applicable.
    - Connect to a secure FTP server located behind the state of Utah's firewall, ensuring all security requirements and/or protocols are consistently met.
    - Upload the XML file specific to the secure FTP server.
- Phase II
    - Once the FINET's system's APIs and web services have been created, tested, and implemented, the new MMS should provide the functionality for a system administrator to configure secure web services. These web services would utilize the FINET APIs to effectively consume the FINET data, thereby achieving the next level of efficient interfaces as the two systems securely interface while sharing their respective data.

Interfaces

The system must follow all required security protocols when interfacing with various UDOT systems. Depending upon the business process, data flow and business requirements, the system must provide the ability to load or update database tables with data provided or extracted from other UDOT systems. Based upon a given interface, the data may be extracted from the Maintenance database, which would be an "OUT" interface, or the data may be coming from other

UDOT systems into the Maintenance database, where this would be an “IN” interface. Of course, there may also be situations where the data would be shared both ways. In cases such as this, the interface would be an “IN/OUT” interface.

Interfaces must be dynamic, automated and transparent to the users, with little need for technical support. All errors must be automatically generated and stored in the database for tracking and timely notifications, based upon business requirements.

1. Work Order Labor Time Entry ♦OUT♦ FINET

A. Transfer maintenance application labor time entry information associated with Work Order to the SAP/FINET payroll system. The interface may have two components, if direct connection cannot be accomplished utilizing APIs, web services, etc.:
   - Validate maintenance payroll data within the maintenance environment (database process) and then populate associated tables in a staging schema in preparation for further processing into the payroll system, if applicable.
   - If a direct connection to the SAP/FINET payroll cannot be achieved in a secure efficient manner, a DTS (UDOT) scheduled job will be utilized to pull the payroll data from the tables in the staging schema and populate the SAP/FINET payroll system; abiding by all applicable security protocols

2. Employee Data ♦IN♦ FINET HR Data Warehouse

A. Automatically transfer appropriate Human Resource information for each Maintenance Station/Department from the FINET / FINET Data Warehouse into the Maintenance Application’s database, to be validated and consumed according to applicable business processes.

3. Work Order Equipment Usage ♦OUT♦ FINET

A. Once Maintenance equipment usage data is recorded within a given work order (and associated day cards), the data is validated, according to predefined business rules. The records that pass the validation process are transferred to a staging schema in preparation for extraction and *further processing before reaching its final destination into the FINET system. The FINET system evaluates the Maintenance equipment usage data assigning any associated costs, with consideration to appropriate categories and coding block information.

*This interface may require manual processes outside of the Maintenance database.

4. Equipment Data ♦IN♦ SFS (State Fleet System)

A. Transfer new and existing data from the State Fleet System (SFS), residing in a staging schema, then finally to the Maintenance database, with the goal of updating the Maintenance fleet related equipment inventory.
B. Maintenance utilizes the fleet equipment inventory in the following ways:
   - Specify fleet equipment used on a work order, noting costs in the following categories:
     - Maintain assets
     - General maintenance tasks
     - Fleet equipment repairs
     - Fleet equipment preventative maintenance
   - Designate which station/department a piece of equipment or a resource is assigned to
     - Track ownership
     - Provide functionality for resource sharing, i.e. equipment, people and materials. This would also include the ability to request resources from the owner/assignee

C. Track associated costs; ensuring costs are associated with the proper project even if a resource is utilized outside of the Maintenance division such as in Construction.

5. Material Master (Commodity) Code List Synchronization ♦IN♦ FINET

A. FINET will provide the master list of materials and their data elements to be consumed within the Maintenance application(s) in the following business processes:
   - Material receipts
   - Work Orders
     - Identification of material usage
     - Identification of material stock bins
   - Definition of materials on activity standards (see activity standard details in section ?)

Important related data elements

1. Material class
2. Commodity codes
3. Descriptions
4. Measurement unit
5. Average unit cost

6. Material Stock and Stores ♦IN♦ FINET

A. FINET is currently the master of all material and inventory data. This interface will transmit this material inventory data from FINET to the Maintenance application database. Items delivered to a UDOT warehouse on an as needed basis, i.e. asphalt, salt and sand may not be available in the FINET inventory until months after its delivery and consumption or usage. Consequently, UDOT has made the decision to Direct Charge these specific items. These are considered to be “non-inventoried” items.

7. Work Order Material Usage ♦OUT♦ FINET

A. Once Maintenance material usage data is recorded within a given work order, the data is validated, according to predefined business rules. The records that pass the validation process are transferred to a staging schema in preparation for extraction and *further processing before reaching its final destination into the FINET system. The FINET system evaluates the Maintenance material usage data applying the usage amounts to the various warehouses, depending on the coding block information supplied by the Maintenance work order. The data is crucial to the proper material costing within FINET.

B.

C. *This interface may require manual processes outside of the Maintenance database.

8. Bridge Work Requests ♦IN/OUT♦ PONTIS

A. Inserts work request records into the Maintenance application database based upon inspections performed by the Structures division of UDOT. These inspections are performed on an ongoing basis, so additional comments may need to be added by updating an existing work request and/or a subsequent open work order, identified by its structure ID; which is assigned by the Structures division

9. Bridge Inventory ♦IN♦ PONTIS

A. Extracts structure inventory records from the PONTIS database and creates new and/or updates the Maintenance application database structure inventory records.

10. Damage Claims and Other Reimbursements ♦IN♦ FINET

A. This interface extracts operations damage claim reimbursement information for accident reports performed by Maintenance. The purpose of this interface is to populate the Maintenance database with reimbursable information for all damage repairs for tracking, follow up and reporting pertaining to Maintenance station and region budgets.

11. Maintenance Expenditures (Originating in FINET) ♦IN♦ FINET

A. All Maintenance expenses in the FINET_ACCOUNTING_JOURNAL and INTERNAL_COSTING_JOURNAL tables residing in the FINET staging schema will be extracted to populate Maintenance database tables to be utilized for various reports, including expenditure reports and accurate budget tracking at the Maintenance station and region level.

12. Equipment Unit Rates ♦IN♦ FINET

A. Utilizes the Maintenance equipment unit rates stored in a staging schema by an ongoing daily automated process that extracts the appropriate data from the FINET system. Once the Maintenance application tables are populated with the new and/or updated data, it is used for equipment usage rates on work orders and various reports, including budget tracking and projections.

13. ePM ♦IN♦

A. Show contingency expenditures - for reporting
B. Ensure maintenance equipment costs utilized for Construction projects are charged to the Construction Project versus the Maintenance Station's budget or "owner" of the equipment

14. Procurement ♦IN♦

A. Provide list of Contractors approved to perform Maintenance work, including all helpful contract related information.

15. UPlan ♦IN and OUT♦

See section nine for the information on UPlan

16. Data, Documents, and Image Migration

UDOT currently has a large amount of data in current business systems. This data will need to be migrated into the selected solution. It will be critical that this is done is a smooth manner to not lose data or have data unable to be accessed during transition.

17. Data Imports

Provide the ability to map and import small or large datasets to the Maintenance database, with the system programmatically enforcing applicable business rules, validation and data integrity. This functionality would be required on a continuous basis, with the data coming from other UDOT systems (databases) and/or third party UDOT contractors.

18. Add/Modify Page Content

A. Ability to add/modify internal and external Links

System Requirements

1. System must be driven by innovative and changing business requirements and not directed or limited by technology
2. Single Sign-on, interfacing with Google Apps
3. Capability to utilize web services or future technology. (For example, ArcGIS web services)
4. User level application access management associated with job responsibilities and predefined application roles. These predefined roles would be created and maintainable by a system administrator within an administrative application itself and/or administrative web pages and associated reports. Some examples of system administrator functionality with regard to user access management:
    a. Define user roles corresponding to job responsibilities
    b. Create, update, or terminate user access by application, if applicable
    c. Assign/update user roles, thereby providing access to specific applications and their respective content or functionality
5. Approximately 1,200 total users with the potential of 200+ concurrent users. System should be at an enterprise level, robust, highly scalable, load balanced, and effectively allocate its resources.
6. Data integrity must be enforced in the application, as well as at the database level with primary and foreign keys, database constraints and database level business rules.
7. The system must provide a mechanism to perform validity checks of data entered at the time it is entered or when data may be imported during an interface process. When data is being entered by an application user -
    a. Edits, data ranges and relationships shall provide the equivalent of manually reviewing data entry and checking for errors
    b. Error messages will be informative indicating why the information is outside of the acceptable range and what corrections must be made.
    c. The system should suggest a solution or suggest where to search for additional help on that topic.
    d. The use of smart drop down lists, selections, etc. ensuring business requirements are met while eliminating data entry errors wherever and whenever possible.
8. Transactions not passing all edits must be stored in the database for later correction and elimination of re-entry. Possibly stored in separate database error tables.
9. Electronic Signature and/or Approvals
    a. The system must allow authorized personnel the ability to perform a final validation of data according to business requirements, e.g. Employees can verify payroll/timesheet data prior to submittal, utilizing electronic sign-off meeting audit requirements.
10. Create audit trail by logging the date, time and user id when records are created, updated and deleted.
11. Provide the ability for a system administrator to lock a user or a group of users out of the system on demand or on a regular automated schedule. This may be necessary on a biweekly basis for payroll processing.
12. Ability to send messages to one user, a group of users or all users.
13. All applications must have the following:

a. Adhere to UDOT security processes, standards and protocols
b. Include administrative forms and reports
c. Always consider mobile functionality when designing work flow, business flow and page content
d. Report content must be categorized into state, region and station groups or categories, along with the ability to display the data in graphs, charts, etc.
e. Users should be able to create reports not only for themselves, but for other users. They should be able to share a report they create with another user or group of users providing a report and/or provide a report to be used as an example to another user where that user could then create their own copy of the shared report and then modify it or customize it to meet their own specific reporting requirements.
f. Responsive Design - web development that allows for different screens sizes, platforms, and orientation (i.e. Mobile devices, desktops, etc.)

Application Hosting Services

UDOT is requiring a solution where the proposer provides the hosting of the application. See the requirements for the technical proposal write-up. Vendor must provide a legitimate "Software Source Code Escrow Agreement" which establishes and maintains an escrow with an acceptable and reputable company to protect UDOT's confidentiality, ownership and best interests. The vendor must also provide an acceptable Service Level Agreement (SLA) meeting UDOT's required level of service, quality, responsibilities, confidentiality, security policies, backup and recovery, and guaranteed uptime of 99.99%.

SECTION EIGHT: Mobile Applications

Overview:

UDOT recognizes the potential for improved efficiency and data accuracy through mobile apps, it is a critical focal point of this RFP. UDOT engages with the transportation system across the entire state of Utah. It is imperative to not only know what happens, but when and where it happens.

Proposers will need to demonstrate that their solution includes well developed maintenance management tools for the mobile environment. They must also demonstrate an ability to assist UDOT, as UDOT develops its own suite of mobile apps. Together, the mobile apps delivered by the vendor, and those developed by UDOT, will be a key turning point in how UDOT manages its maintenance workforce.

As UDOT has worked through its own internal apps, it has recognized that the mobile environment presents many unique challenges that must be addressed. Each challenge has been addressed and overcome with many of UDOT's internal efforts. As such the expectation for an elegant, functional and cost effective solution is imperative to project success.

Key Functionality:

1. **Multi-Platform:**

   In order to allow UDOT to take advantage of the current and future market of mobile devices, the mobile apps in its new MMS system shall be designed to be cross platform. The key operating systems being considered as cross platform, are Apple's iOS, Google's Android and Microsoft's Windows Mobile. The vendor should be able to articulate their approach to mobile deployment as well as the process they utilize to provide dynamic app updates with minimal interruption to system users.

2. **Multi-Device Size:**

   UDOT desires the ability to select the right blend of devices to accomplish the most economical and functional implementation of mobile devices. There are times when a tablet is more functional for some tasks, but a phone based app can be used for more routine simple record keeping. UDOT will work with the winning proposer to find the right balance of devices and platforms to leverage the maximum potential of the MMS system and UDOT's workforce.

3. **Disconnected Mode:**

   The UDOT highway network covers over 5,800 centerline miles throughout Utah. Because of Utah's diverse mountain topography and large uninhabited areas there are many locations that are not currently served by cellular data services. In addition to the challenges of Utah's topology, providing cellular data plans for 700+ employees would be cost prohibitive. As such, UDOT is looking for a vendor that can provide mobile apps that are the optimal balance between field functionality and cost effectiveness in a statewide deployment.

   While not all system functions will be replicated in a mobile environment, those that are deemed critical or useful will be a blend of cellular data connected and disconnected. The vendor should identify their current abilities and system functions that can be utilized in a disconnected mode as well as describe their intentions to help UDOT develop a custom set of field apps as part of the project.

   Ultimately, UDOT envisions a mobile platform that is able to find the balance of device size, disconnected maps, app complexity and cost. To accomplish this, the proposed system shall be able to demonstrate effective data flow management, ability to store area maps (tiled to allow for detail in selected areas) and provide seamless consistency across multi-platform devices.

4. Versatile App or Suite of Apps:

It is unlikely that any proposed system will contain all the unique functions that UDOT wishes to push to the mobile environment. The proposer shall have sufficiently demonstrated their experience and ability to develop the types of mobile apps that UDOT wishes to deploy, but they must also be willing to help UDOT advance the mobile functionalities as our mutual business relationship develops.

Required Mobile App Functionality:

A. Work Request functions
B. Work Order Functions
C. Highway Asset Inventory, Inspection, and Management
D. Work with UDOT GIS API/Rest Service/JSON
E. Stormwater Pollution Prevention Plan (SWPPP) inventory/inspection/reporting.

Possible Future App Functionality:

A. Snow Plow Truck pre-trip inspections
B. Crash cushion inspections
C. Foreman's Log
D. Integration with UDOT's Automated Vehicle Location (AVL) system to track vehicles and find assets.
E. Others as determined in the future

As mentioned earlier, it is UDOT's intent to work with the winning proposer to further develop the mobile suite of applications based upon the winning system design and limitations.

SECTION NINE: Geographic Information System (GIS) Needs and Requirements

Overview:

This section will discuss the GIS-specific needs and requirements for the maintenance management system. This covers the collection, management, and tracking of spatial data and assets, and considers desktop, mobile, and offline work environments. Currently, UDOT has existing records for the spatial location of many different assets, from culverts, to signs, to pavement markings and others. This data has been collected through a variety of methods, including field collection, desktop digitizing, or Lidar point cloud collection efforts. Most of these layers, however, are static snapshots of assets as they existed at a particular point in time, and are not dynamically updated as assets are maintained, moved, eliminated, or constructed. The assets are also not linked to any other business systems, such as work orders, materials, or budgets. The new maintenance management system needs to enable UDOT to maintain an up-to-date inventory of existing spatial assets, track asset history, and tie other business systems to unique assets.

UDOT's Existing Spatial Data:

UDOT's spatial data is managed in an Oracle database, and layers that are intended to be consumed by the public, or department-wide, are published from an enterprise or a file geodatabase to web services in UPlan, UDOT's ArcGIS Online platform. Depending on the end user needs and business case, these products are then made available as services, maps, or apps. Selected data layers can also be filtered and downloaded through the Open Data portal. The maintenance management system will need to consume, read, and write to these live data services, not copy them to the vendor's system. It's understandable that in order to go offline some level of temporary copying to a mobile device would be needed.

1. Requirements:

A. Use existing data sources
B. Update data and keep asset inventory by enabling mobile data collection as new assets are constructed
C. Write in and out of an enterprise geodatabase
D. Incorporate any schema changes happen in UDOT's databases
E. Do not copy the data - consume UDOT REST services
F. Dashboards are fed by live data and update accordingly
G. Track and retain historical data - do not overwrite records
H. Spatial data is stored on UDOT systems - related materials such as work orders or performance metric information can be stored in the vendor's system

Tie Spatial Data to Other Business Systems

UDOT has many different business systems that handle various tasks and applications. The maintenance management system must be able to tie these different systems to unique spatial assets where applicable.

1. Requirements:

A. One-to-many relationships; e.g., multiple work orders (historical information) to one asset
B. Tie non-spatial data (e.g., work orders) to all geometry types - points, lines, and polygons
C. Must fit with existing dashboard systems (e.g., Socrata)

D. New maintenance station boundaries may be created and/or existing boundaries may change. When this happens, the assets with mile point locations located within the respective station boundaries must be updated accordingly.
E. Update assets/features when the LRS changes (Route and Milepost)
    - When changes are made to UDOT's LRS on a particular route, the maintenance management system must incorporate these updates and ensure that all assets along this route are updated accordingly. This must be accomplished in a way that does not result in the loss of any data or relationships - e.g., historical inspection records are retained and maintain their existing relationship to assets.

Dashboard and User Interface

UDOT personnel must be empowered, not hindered, by the business systems that they are required to use to perform their daily tasks. Accordingly, the user interface and dashboard of the maintenance management product must be intuitive, easy to learn, and look consistent across multiple different applications.

1. Requirements:

A. Clean, easy-to-use interface in both mobile and desktop environments
B. Do not make maintenance personnel learn multiple user interfaces and dashboards
C. Dashboard interface can be configured by UDOT personnel
D. Reminders for tasks can be triggered by an event, or on a set calendar schedule
E. Functions in desktop and mobile environments, and across multiple operating systems

Asset Degradation and Maintenance Prioritization

Assets degrade over time, and one of the difficult tasks that UDOT maintenance faces is the need to prioritize limited funding to meet these seemingly unlimited needs. The maintenance management system should support UDOT's project prioritization and funding decisions by providing asset tracking, risk, and forecasting metrics.

1. Requirements:

A. Help identify where limited dollars are best spent
B. Identify areas of high risk
C. Track asset lifecycle, degradation, value, maintenance needs, and cost forecasting

Mobile Data Collection

UDOT's maintenance stations are spread across the state in both urban and rural areas. The maintenance management system must be fully mobile capable, to support work in areas without cell coverage and also to support work on mobile devices for which data plans have not been purchased.

1. Requirements:

A. Ability to connect to WiFi at the beginning and end of each work day; download all materials (e.g., base maps, spatial data, assets, work orders, etc.) necessary to complete the day's tasks, and then synchronize when connectivity is available
B. Configurable apps
C. Work on all platforms - Windows, Android, iOS

LRS and Esri Roads and Highways Integration

A linear referencing system (LRS) is a key component to managing transportation and roadway assets. The simple explanation of an LRS system is utilizing Route and Milepost for location information for everything that takes place on the roadway. This would include inventory features, events, Work Orders, etc. The ability to work with a LRS system is critical to the functionality of the selected MMS. UDOT uses the LRS across nearly all business functions to bring a consistency in location information. It also assists in knowing which route data is tied to.

The new maintenance management system needs to work with both UDOT's existing Oracle LRS and the planned move to Esri's Roads and Highway system. Data in the system must be kept in sync with the current LRS, and must be able to exchange data back and forth.

1. Requirements:

A. Full integration with Oracle LRS and then Esri's Roads and Highways
B. No version-locking - the maintenance management system must not have a dependency on the version of Roads and Highways
C. Exchange data back and forth with Roads and Highways
D. Identify the interface - does the system use internal or external events?
E. Data must be kept in sync with the most current version of the LRS
F. Ability to handle data that is spatially located by both route and milepost and/or latitude and longitude
G. Support Federal reporting
H. Management of local assets on non-state routes

SECTION TEN: Feature Inventory

Overview:

One of the most important aspects of maintaining features on Utah roadways is to know the location and attributes of those features. UDOT currently engages in robust and thorough data collection efforts to obtain this feature inventory.

These data collection efforts are carried out by many different approaches. The data may be collected by a systemwide effort completed by an outside vendor. It may also be collected one sign, guardrail, or snow fence at a time. Another method may be after construction of a section of roadway all of the features are provided to Maintenance by Construction.

It is then critical for UDOT to be able to interact with this database in a simple to use and intuitive interface that interacts with the many other aspects of the software solution. The ability for UDOT to quickly and simply sort, filter, and update data is very important.

Key Functionality:

Feature Inventory Database:

Each of the features have their own unique set of attributes and condition information. The new MMS will need to be able to have each of the features contained in their own table structure that is simple to setup and manipulate. The attributes will be a combination of pick lists and free fill data fields. The system will need the ability for setting up of these pick lists specific to that feature.

Some assets have a parent/child relationship that will need to be linked within the new MMS. An example is the relationship between a sign and the sign assembly. Within the sign database will be a unique ID that correlates to a specific sign assembly in another data. A parent (sign assembly) may have multiple children (signs) associated with it.

Temporal/Historical Retention:

Part of maintaining the Utah Roadways is the ability to see what work has been done in specific areas over a period of time. The new MMS will need to be able to retain the history of changes made to a specific asset. If a sign on the side of the road is being replaced every year because it is getting hit, UDOT would need to be able to see the history of Work Orders that has been done in that specific location. This may lead to the need for protection around the sign or possibly placing the sign further down the road.

Many times a feature is retired due to it being moved to a different location or being removed entirely. The new MMS will need to be able to retain the record of that asset so it can be pulled up at a later time. This may be achieved by having an inactive/active status or some other method of being able to sort this data separate from the active features on the roadway.

Work Request/Orders

The new MMS will need the ability to tie Work Requests and Work Orders to specific features on the road or facilities. A Work Request or Work Order may be tied to one specific asset or it may be multiple assets. A crew may be going out in the field to only work on one barrier end treatment or they may be working on dozens of signs in a specific area. The system will need the flexibility to consider various scenarios.

Route and Milepost

In addition to GPS location information, UDOT also utilizes a Route and Milepost to identify the location of any feature on the roadway. This was discussed in further detail earlier in Section Nine.

Mapping

It would be helpful for UDOT to be able to view assets on a map within the MMS. This would enable crews to be able to quickly see which features are in a specific area without having to go out to a separate mapping program.

Resource Documents for the Vendor/Proposer:

- Current feature inventory
- Current database structure showing pick lists

Mobile Feature Inventory Collection/Updating

To be able to keep the Feature Inventory as up to date as possible, it's critical for individuals to be able to update and add features to the inventory while in the field. Mobile applications that allow for updating of Feature Inventory assets and also to add in newly installed or found assets will provide UDOT the ability to keep their inventory current. Updating may involve changing different attributes of an asset or perhaps the location. These applications will need to be easy to use and allow for offline functionality. If the applications require significant clicks and data entry, the likelihood of the application being used goes down.

Dynamic Quality Assessment (DQA)

The intent of the DQA functionality is to utilize many of the built in features and functions of the MMS system to represent work crew efficiency, system health, and funding needs. Work Orders, Work Requests, feature inventory and condition assessments will serve as the basis of the calculations.

Feature inventory will be broken down into sub classifications such as Safety Critical, Non-Critical, Functional or other classification to represent the urgency with which it needs to be repaired. Safety Critical items will be things such as impact attenuators or signs. Non-Critical would be things such as right-of-way delineation fence that does not control access.

As the new MMS system begins to develop more work order history, system health and UDOT maintenance crew response will be graphically represented using financial, temporal and geographical data collected during the work order process. For example, the time to complete safety critical functions will be a key performance indicator.

The DQA process will also have the ability to collect condition data on assets that are not easily collected by the LiDAR collection process (done by others). Highway features that are not visible from the roadway include edge rut, culverts, drainage boxes, etc. The ability to assess the condition of these items will also be critical to the overall representation of system health.

Finally, the system will be able to have drill down dashboards that help users identify, locate and review highway cost of maintenance, types of costly repairs, outstanding needs, crew efficiency, frequently repaired items or other aspects that will be beneficial to help direct work, funds or future needs.

SECTION ELEVEN: User Friendly

1. Because the application will be used by individuals with a wide range of computer experience and understanding, it is critical to the success of the implementation of the software that the application be easy and simple to use.
2. The application must be usable without reading a printed guide. This could include tooltips, pop-up windows, helps, and short video demonstrations. If the complexity of the tasks being automated cannot feasibly be embedded into the software interface, reading a printed guide may be unavoidable. In this case, the most that any individual user should have to read for any particular application is 1-2 pages— short enough to read in one sitting.
3. Users should be able to accomplish every task and entry with the fewest possible keystrokes. For instance, dates should not necessitate typing four digits for the year unless the context of the given field leaves considerable doubt as to which millennium might be intended. In many cases, keying in any characters at all for the year may be an unnecessary expense of the users' time. Functionality such as auto tab ahead when fields are filled in would also be an example.
4. The interface should enable all interaction techniques and input to be discoverable and chosen from a browse-able, hierarchical structure, arranged in order of the functions the user needs to perform. For example, this can be satisfied with multiple graphical choices, in the form of icons and segmented clickable graphics, meaning the graphic or report would have "drill down" functionality, with the link navigating to additional details about the data linked to the summary or top level report. What this requirement specifically precludes is reliant solely on any of the following techniques: command line syntax; parameter (INI) file options not built into the interface; techniques supported only by combination keystrokes, mouse techniques, or combinations thereof; techniques requiring knowledge of special, manually entered values.
5. The interface and messages should make it clear why the program does what it does.
6. Intuitive, using provided information to predict what the user wants.
7. Searchable
8. Speech to text capabilities.

Appendix B: Draft Requirements Matrix

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Provided as a separate attachment in Microsoft Excel format. See the following example pages in PDF format.

This spreadsheet presents the functional requirements for a MMS that will be responsive
to UDOT's highway maintenance management business environment, practices, and information needs.
The requirements are numbered and structured in a format that will facilitate evaluation of commercial off-the-shelf (COTS) software.

Please use the response matrix that is presented in the following tabs to indicate how your proposed software meets each requirement.
The first six tabs corresponds to the six phases in the future model. Additional tabs present inventory, resources, technical, and other requirements.
The list of instructions provided below pertain to all the tabs.

For each requirement, please place an "X" in the column for either "OTB" or "Requires Customization."

The matrix in each of the nine tabs has six columns --

Column A: Requirement identifiers

Column B: Provides a description of each functional requirement

Column C/D: Allows the Bidder to determine whether the requirement is met out of the box or via customization

Column E: Allows the Bidder to assign a cost(hourly rate x hours required) to any requirement that is met via customization

Column F: Comments related to the requirement

Requirements Calculation:	**Total Requirements:**	**105**
	OTB Requirements:	**0**
	Customization Requirements:	**0**
	No Response:	**105**
	Percent Met OTB:	**0%**

Requirements Type	Total #	Percent of Total
Mandatory	0	#DIV/0!
Important	0	#DIV/0!
Desirable	0	#DIV/0!
	0	

Double-check (total # of requirements)	
Planning and Budget	12
Organizing Functional Areas	6
Directing Functional Areas	6
Managing and Analysis	6
Other	19
Interface	32
Mobile	3
GIS	6
Feature Inventory	7
User Friendly	8
Total	**105**

1. Planning and Budget

Req #	Functional Requirements	Importance			Meets Requirement?			Level of Effort	
		Mandatory	Important	Desirable	Yes, OTB	Yes, Customization Required	No	Hours	$
1.01	Budget must be generated at the station level and construction level and then build to a Region Level								
1.02	Budgets must be distributed from Central and make their way down to statio								
1.03	Each Fiscal year will include: a.Requested Budget b.Approved/Initial Budget c.Working Budget								
1.04	System should include intuitive and interactive Business Intelligence tools to help all partic								
1.05	System must drill down into details from Finet and the system information that has not yet be pushed to Finet								
1.06	System must incorporate both an initial budget as well as a Three-Year planning budget for larger projects.								
1.07	The Facilities, Lands and Buildings, and Rest Area budgets must be tracked in the system.								
1.08	A Pavement request and tracking budget must be included in the system. A function of this is								
1.09	System can accommodate external contractors bids and track costs								
1.1	System must efficiently represent the Construction Field Crew Request								
1.11	System must effectively manage the EFM and Methods project budge								
1.12	System must interact with FINET (see Section Seven for phases of FINET interaction) to provide near real-time financial numbers and employee loaded rates. a.) Budgets need to be displayed on activity screen (or other screens where applicable) when creating a work order or a work request so that the station supervisor can see what he has remaining in his budget to perform the work. b.) Electronic PO's that could then be sent for signature should be developed in the system so there is less paperwork.								

Total Requirements:	**12**
OTB Requirements:	**0**
Customization Requirements:	**0**
Requirements Not Met	**0**
Percent OTB:	**0%**

Mandatory:	**0**	**#DIV/0!**
Important:	**0**	**#DIV/0!**
Desirable:	**0**	**#DIV/0!**
Total:	**0**	

No Response 12

Mobile capabilities
None required for this Section.
Resource Documents for the Vendor/Proposer:
1. Activity group list
2. Budget spreadsheet
3. Construction Field crew requests
4. Description of how FiNET gets its info
5. EFM/Methods Spreadsheet
6. Activity standards
7. Activity performance standards

2. Organizing Functional Areas

Req #	Functional Requirements	Importance			Meets Requirement?			Level of Effort	
		Mandatory	Important	Desirable	Yes, OTB	Yes, Customization Required	No	Hours	$
2.01	**Internal Resources Database:** A searchable, intuitive, and interactive database of Department employees and Department-owned equipment that can be scheduled by unique identifiers with specific attributes is required of the new MMS program. Required Functionality related to Internal Resources Database: a.) Schedulable personnel resources for Department Employees. b.) Schedulable equipment resources for Department-owned equipment. c.) Resources are assigned unique identifiers. d.) Resources are shared across the Department, but resources assigned to any given maintenance station are presented first in a short list. e.) Personnel resources have modifiable attributes for certifications, work restrictions, user costs, unavailability due to planned vacation or temporary assignment to construction, and additional customizable fields as needed. f.) Equipment resources have modifiable attributes for certifications, maintenance requirements, calibrations, user costs, and additional customizable fields as needed. g.) Station admin can easily add or edit resources. h.) Resources are scheduled by the day and cannot be double-booked.								
2.02	Work Calendar: A resource-loaded schedule that is used by station supervisors to perpetually plan work. Required Functionality related to Work Calendar: a.) Planning unit is by hours. b.) Working days can be customized to work around holidays and other days when work cannot be accomplished, such as vacation and training days. c.) Can be modified to view in day, week or month mode d.) A unique Work Calendar is provided for each maintenance station. Can drag or stretch planned Maintenance Activities or Work Orders to modify start dates or durations. Required automatic edit checks ensures resources are still available. e.) Stations may share view rights to their calendar with other stations, and other roles as desired by the station. These roles could include Area Supervisors, Maintenance Engineers, etc. The ability for a manager to see subordinates calendars without the subordinate, needs to be incorporated in the roles for the managers. f.) A Work Calendar is provided to construction engineers so they are able to reserve personnel resources for construction inspection. g.) As a result of all work being geo-referenced, the calendar can show planned activities within a defined time period on a map interface. h.) As a result of all work and resources being cost-loaded, the calendar can export anticipated expenditures within a defined time period. This cost loading comes from the activity standards. i.) In effort to manage overtime and budget, a warning system acknowledges when an employee resource is scheduled for more than 40 hours per week and also other incentive pay. j.) Generate and print customized schedules for individual personnel, equipment or crews. k.) Hours per day can be customized (usually 8 or 10). l.) A unique Work Calendar is provided for each piece of equipment that is populated by the work requests or work orders. m.) The calendars sync with Google Calendar. n.) Ability to track personnel and equipment resource allocation and productivity over defined time periods.								
2.03	Workload Distribution Interface: A navigable interface unique to each maintenance station that facilitates identifying and scheduling prioritized Work Requests, Work Orders and tasks. Required Functionality related to Workload Distribution Interface: a) Potentially shown as a widget at bottom or sides of the Work Calendar interface (see drawing at the end of this section) b) Contains multiple tabs for these types of work: •Work Requests •Summer Task List •Winter Task List •Additional tabs as needed c) Each tab contains a list of tasks that consists of Maintenance Activities. •The Task Lists are customizable by each station supervisor. •The Maintenance Activities can be generated in several different ways: o The supervisor generates repeatable tasks based on common activities needed in that maintenance boundary. Rainy day type tasks •Maintenance Activities would not disappear off the task lists like Work Orders because they are repeatable tasks that are used often. •The Maintenance Activities contain attributes for personnel, costs, equipment, duration, location, materials, coordinating entities and additional customizable fields as needed. d) The Work Request tab also contains Work Orders. e) Work Orders can be generated in several ways: •Are created internally for routine maintenance activities and betterments. •Are generated from Work Requests originating from Click n Fix. •Are generated from the mobile UI as pinpointed repair work is identified in the field. •Can be created by other entities within the Department such as Structures, Asset Management and Safety as they identify repair work needs. •After-the-fact emergency work. f) The Work Orders contain attributes for personnel, costs, equipment, duration, location, materials, coordinating entities and additional customizable fields as needed. g) Using the Workload Distribution Widget GUI:								
2.04	Mobile capabilities for Organizing Business Processes: Desire to have as much functionality available as possible								
2.05	Spatial capabilities for Organizing Business Processes: Planned activities show on a map that can be used to see what is planned in that area.								
2.06	Resource Documents for the Vendor/Proposer:								

Total Requirements:	**6**
OTB Requirements:	**0**
Customization Requirements:	**0**
Requirements Not Met:	**0**
Percent OTB:	**0%**

Mandatory:	0	#DIV/0!
Important:	0	#DIV/0!
Desirable:	0	#DIV/0!
Total:	0	
No Response	6	

3. Directing Functional Areas

Req #	Functional Requirements	Importance			Meets Requirement?			Level of Effort	
		Mandatory	Important	Desirable	Yes, OTB	Yes, Customization Required	No	Hours	$
3.01	**Key Functionality:** All of this section is a required function. The Department's workflow for directing begins with a "Work Request" which is an initial identified work need which can be created within the maintenance management system, as an automated work request, or on our Click N Fix App. Certain activities that are more routine may begin as a Work Order skipping the work request process. The "Work Requests" will then become a Work Order once the Station Supervisor has recognized the work request and has assigned an activity/activities to it and made a plan to execute the identified work need. The work order or work request shall be able to be moved into a daily, weekly, biweekly, or monthly interactive work calendar to which you will also be able to add resources . Some work orders will be automated. Automated work orders will be assigned to specific units with varying activities such as facility maintenance, stormwater inspections, or fire suppression inspections, etc. on an adjustable or fixed schedule (quarterly, annually, etc…). In completion or approval of the Work Order, the process will be confirming the resources used to complete and process a payroll entry, an inventory use, or other items that must be recorded. The user will be able to enter work request or work order information while in the field using responsive design, whether or not the mobile device is connected to the internet.								
3.02	**Work Request:** Work requests shall be capable of being created from a mobile capability to include photos, mapping locations (polygon lines) to describe work area, and the capability to include identified assets. Work Request should be able to be scheduled on the calendar before they are turned into work orders in order to plan in advance. Work requests must consist of the following information: a.) Asset or multiple assets if required by activity. b.) Activity or activity group c.) Date created d.) Who created and how to reply e.) Location of assets or marked areas on mapping feature f.) Priority (Safety Sensitive, Risk based) g.) Photos section h.) Description section i.) Items needed to repair section All of these items are not required to be filled out the user, but they must be available so that we can obtain as much information as possible. The majority of the information will be required for the work order so to have it completed in this step versus having to do it again in the work order [illegible]								
3.03	**Work Order**: In this process the Work Order is recognized, scheduled, and sent to the individuals and/or contractor that will be responsible for executing the work. Work Orders for contractors may result in a Purchase Order. Work Orders must have the capability of tracking multiple work requests and or multiple assets and activities on a single work order. This option allows for one work order to be completed for multiple work requests so that it saves time for the end user and allows them to document all work that has been done. Work Orders must consist of the following information: a.) Asset or multiply assets if required by activity and the completed work order will update the condition of the assets that were repaired or worked on, and update the performance report accordingly. Additionally the completed work order will update the asset inventory, including attributes of assets repaired or replaced.Activity b.) Unit / Org c.) Date and time created d.) Who created e.) Edit tracking and communicate back to initiator that the work was completed (i.e. mark work request complete, send "issue resolved" message back to Click-and-Fix, etc.) f.) Employees working on the work order. Use the correct payroll time code (e.g. regular pay, overtime, differential pay, etc.) based on parameters supplied by UDOT. Translate labor used in the performance of the work into time records for each individual, to be used in payroll g.) Location of asset or marked area on mapping feature, use a map interface to allow the user to record the work location and/or specific asset being worked on. h.) Priority (Safety Sensitive, Risk based) i.) Photos section j.) Description section k.) Items needed to repair section (material), Update materials inventory as a result of materials used in performing the work l.) Selected equipment to be used. Pass equipment usage information to Fleet Management database. m.) Selected personnel to be used								
3.04	**Completion of Work Order:** Completion or approval of the Work Order is the process that may consist of confirming or changing the collected information on the Work Order process. Once information is confirmed correct by the Station Supervisor or Designated Station Leads (Assistant Supervisor) this completion process then generates payroll.								
3.05	Mobile capabilities for Organizing Business Processes • All functional requirements as described above • Ability to see budget for the activity that the work order is assigned to.								
3.06	Spatial capabilities for Organizing Business Processes • All functional requirements as described above								

Total Requirements:	**6**
OTB Requirements:	**0**
Customization Requirements:	**0**
Requirements Not Met	**0**
Percent OTB:	**0%**

Mandatory:	0	#DIV/0!
Important:	0	#DIV/0!
Desirable:	0	#DIV/0!
Total:	0	
No Response	6	

4. Managing and Analysis

Req #	Functional Requirements	Importance			Meets Requirement?			Level of Effort	
		Mandatory	Important	Desirable	Yes, OTB	Yes, Customization Required	No	Hours	$
4.01	**Performance and Cost Reporting:** When work has been performed, the system will be able to supply the user with detailed information regarding the cost of the work done, (labor, equipment, material, contract costs), and the result achieved (accomplishment, or improvement). Work may be done in the form of 1) repairs/maintenance of individual assets (e.g. signs), 2) repairs/maintenance of classes of assets (e.g. delineators) for which less detail is needed, or 3) services performed which do not impact the condition of physical features (e.g. snow removal, litter pickup, weed control). The system should be able to report cost and performance in terms that can be used by all three forms. In each case, translate the accomplishment into a performance metric that can be used to a) report on our accountability to UDOT senior leaders, commissioners and legislators, and the public, b) enable course corrections, process improvements, or resource reallocation, c) predict the cost to achieve a given level of service, and d) provide reports on assets, ie: how many times it has been repaired, damaged, etc. so we can analyze the lifecycle of an asset and the location. Required Functionality Related to Performance and Reporting: a.) The system reports performance based upon the work accomplished, in combination with methods of condition assessment that don't require extensive use of manual surveys or visual, subjective observations. b.) The system supports a Performance Based model for maintenance management, including asset inventory, condition assessment techniques, risk management, performance standards, and performance metrics. c.) The system supports Performance Based Maintenance Contracting, allowing the Department to use the system to manage work performed by contractors under performance based contracts, employing the same measures and reporting tools as for agency-performed work.								
4.02	**Field Performance Evaluation:** Once all this information is collected, having the ability to query any portion of the database, at any detail and view it in charts and graphs will reveal trends, show areas of improvement and areas needing more attention, and will help managers make informed decisions when adjusting the work program at either a crew, region, or statewide level. Required Functionality Related to Field Performance Evaluation: a.) The system should provide the ability to evaluate how work is being accomplished in the field compared to any part of the Activity Standard. This information will be used in adjusting the activity standards as necessary, at UDOT's discretion (not automatically). b.) The system should provide the capability of using performance standards to evaluate the comparative efficiency, productivity and cost-effectiveness of various work procedures, equipment, material types and crew sizes. c.) The system should track, report, and maintain a history of field inspections including semi-annual inspections. The system should also track inspection due dates, date performed and the associated condition, status and comments. d.) The system should provide a suite of standard reports and graphs to help managers at all levels evaluate the performance of their crews. Such reports could include: • Expenditures vs. budget, including projected expenditures by year end, for the budget as a whole, and for major activities such as snow removal and hard surface maintenance • Expenditures vs. condition for various activities or activity groups (i.e. What outcome did we buy for our money?) -Snow removal cost per plow route, surface area, and lane miles. -Other areas as needed and determined at later dates								
4.03	**Analysis and Management Action:** The ultimate purpose of a maintenance management system is to enable managers to improve the maintenance operation. This need exists at several levels, including the station level, the area level (a group of several stations), the region level, or statewide. At each level, managers need access to information that is easy to consume and understand, and that informs decisions that could include redeployment of resources, redefining work priorities, identifying needed process improvements or training, adjustments to work schedules, and others. The system therefore needs to help us evaluate our work plan compared to our actual performance by activity, work crew or private contractor, expenditure, or performance standard. Required Functionality Related to Analysis and Management Action: a.) Interface to the UDOT Socrata performance management dashboard so that managers can easily access important performance measures on the same platform as other UDOT measures. b.) Include standard reports, graphs, and analysis tools that enable effective decision making. c.) Include a capacity for customizing reports, graphs, and other analysis tools to meet local or regional needs. d.) Track spending throughout the fiscal year with simple visual comparisons to the amount budgeted (with projections of expected spending vs. budget), previous year's spending, and average year spending for the same activity or group of activities.								
4.04	**Pavement (Hard Surface) Maintenance Tracking Analysis and Reports:** A special case of Performance and Cost Reporting relates to pavement (hard surface) maintenance. Some preventive pavement maintenance work, including seal coats and other similar treatments, is performed under UDOT's STIP process, financed by the construction line item (usually with federal funds). The same types of treatments are performed either by UDOT maintenance crews or by procurement contracts, financed by the operations (Code One) line item. In both cases, potential projects are identified by the Pavement Management System (dTIMS, a software licensed to UDOT by Deighton Associates, Ltd.), or by a combination of data from dTIMS and visual observations by maintenance and engineering staff. Pavement maintenance work performed by UDOT crews or by procurement contracts are tracked and managed purely within the maintenance management system. Required Functionality Related Pavement (Hard Surface) Maintenance Tracking Analysis and Reports: a.) Provide ability to compare Hard Surface Activity totals (group 2 activities) with Maintenance Region Level FY budget requests, with the ability to verify whether the requests are in line with the totals. b.) Ensure reporting consistency between State, Region and Stations c.) Provide functionality for users to report Hard Surface Expenditures for Level I (high volume) and Level II (low volume) roads. d.) Communicate preventive pavement maintenance work performed to UDOT's pavement management system (dTIMS).								

4.05	**Updating of Planning Values:** To complete the maintenance management cycle, data recorded and developed using the functionality within the Managing and Analysis area are used to update values in the areas of planning, budgeting, organizing, and directing. For example, work activity standards are updated using the actual labor, equipment, and materials used for all work orders (including the accomplishment). This update is an automatic process done by the system but is not put into production until it is reviewed and manually put there by a UDOT employee. Also, asset inventory is updated and a historic record is maintained, including presence of assets, attributes of those assets, and asset condition. Data regarding labor and equipment used, and calculated productivity, can be used within the activity standards to more precisely plan future similar work, including calendaring, workload distribution, and resource requirements at a station level. Required Functionality Related to Updating of Planning Values: a.) Update the feature inventory, including presence, and attributes. b.) Update the condition of each feature (or class of features) worked on. c.) Provide information to UDOT for effective decision making regarding updating the activity standard for each activity that was performed for: Statewide • Regionally • Per station								
4.06	**Required mobile capabilities for Managing and Analysis** a.) Ability to view assets to be worked on by means of a map interface b.Ability to view materials inventories in real time or near real time c.Perform all of the above functions while in the field, whether connected to the Internet or not. Required spatial capabilities for Managing and Analysis a.Ability to view maintenance costs by route segment, by group of selected route segments, or by area. b.Ability to view assets to be worked on by means of a map interface. c.Ability to track and review changes over time for temporal analysis								

Total Requirements:	**6**
OTB Requirements:	**0**
Customization Requirements:	**0**
Requirements Not Met	**0**
Percent OTB:	**0%**

Mandatory:	0	#DIV/0!
Important:	0	#DIV/0!
Desirable:	0	#DIV/0!
Total:	0	
No Response:	6	

5. Other Functionality

Req #	Functional Requirement	Importance			Meets Requirement?			Level of Effort	
		Mandatory	Important	Desirable	Yes, OTB	Yes, Customization Required	No	Hours	$
5.01	**Facilities/Lands/Buildings:** UDOT maintains different types of facilities and these assets would need to also be tracked. Similar to an asset on the roadway, these assets have regular maintenance that needs to be performed in order to extend their lives. Attributes of each facility would need to be tracked and could possibly be part of a work order on the facility. Additional functionality would include:								
5.02	**Preventative Maintenance Tracking** for each item of equipment in the facility: UDOT needs an automated system to manage the preventative maintenance scheduling and equipment databases. a.) Automated notifications when a preventative maintenance item is due for completion. b.) Reports for past due maintenance sent to manager and Lands and Buildings Manager								
5.03	Facilities located geospatially or to show them on a map.								
5.04	Facility Work Orders a.) Capture maintenance time (labor) b.) Costs c.) Nature of Repair d.) Provide basis for identifying maintenance backlogs on the facility e.) Additional items may be required.								
5.05	Inspections a.) Monthly, Quarterly, and Annual inspections that are automated and reported to management if they are not done in a timely manner b.) Ability to provide accurate reporting to show the state building board the annual O&M costs for buildings.								
5.06	Rest Areas a.) Possible Work Order incorporation with Rest Area contractor b.) Ability to track regular inspections that take place on all Rest Areas that are performed by UDOT. The inspections may result in needed Work Orders to the contractor.								
5.07	Required Functionality related to Facilities/Lands/Buildings: Everything listed above in the Facilities/Land/Buildings section								
5.08	Mobile capabilities for Organizing Business Processes ○All functional requirements as described above								
5.09	Spatial capabilities for Organizing Business Processes ○All functional requirements as described above								
5.1	**Storm Water Program:** UDOT is required to monitor and maintain certain storm water information. Part of this is extensive record keeping and inspections that are required of UDOT. Listed below are some of the requirements that are required now, but others may be needed in the future. This area needs to be highly adaptable and configurable by UDOT as laws and requirements are always changing.								
5.11	Asset Database a.) A single location such as a maintenance shed may have many different attributes such as: b.) Retention c.) Detention d.) Outfalls e.) Etc.								
5.12	Inspection a.) Weekly and quarterly inspections. b.) Visual inspections during a rain event c.) Incorporation with existing UPlan applications i.)Need to read/write to current data ii.)Multiple question survey forms. For example, if a person answers “yes” to a question they get a different set of subsequent questions than if they had answered “no”.								
5.13	Schedule/Tracking for regular inspections, cleaning, and repair of catch basins, storm water conveyance pipes, ditches and irrigation canals, culverts, structural stormwater controls, and structural runoff treatments and/or flow control facilities.								
5.14	Incorporation of outside entity maintenance agreements for facilities that have been turned over to other entities.								
5.15	Required Functionality related to Storm Water Program: Everything listed above in the Storm Water Program section								
5.16	Mobile capabilities for Organizing Business Processes: All functional requirements as described above								
5.17	Spatial capabilities for Organizing Business Processes: All functional requirements as described above								
5.18	**Road History/Information** Sections of roadway can have various types of documents, agreements, warranties, etc tied to a specific point of section of roadway. It is optimal to have an application that would allow for a section of roadway to be outlined using points, lines, or polygons and then attached a document or other type of backup information. Examples of this function are: a.) Easements b.) Maintenance Agreements c.) Utility crossings d.) Product Warranties (such as Pavement Marking Tape)								

5.19	**HMA Cost Calculator** a.) Provide the ability to determine, on a project by project basis, the lowest cost source for Hot Mix Asphalt (HMA) based upon each pre-approved supplier's HMA plant location and contract price per ton, the location of the project, and the cost of transporting the material (whether transported by UDOT forces or delivered by the supplier) from the plant to the project. To clarify, the pre-approved (by Procurement) HMA supplier's location would be relative to the user selecting a specific location for the HMA delivery on a map. This is currently accomplished by the user utilizing Google Maps (via a link) in a Google spreadsheet to identify the location by dropping a pin on the map to obtain the longitude and latitude of the project. Once the project coordinates have been identified, the application should then calculate the distance along a reasonable route on public roads from each plant to the project, and calculate the costs for all pre-approved supplier plants, returning for display the plant location, price, and total cost for the three or four lowest cost options. b.) The HMA Cost Calculator would provide the following outcome or cost for each vendor: -One Way Distance (in miles, for hauling/delivery) -UDOT Labor Rate -UDOT Equipment Rate -Price per ton HMA (Hot Mix Asphalt) -Final Total cost per ton The application would need to interface with the Procurement database to obtain a dynamic list of pre-approved HMA suppliers, the contract number for each supplier, contracted HMA price per ton, and address of each pre-approved HMA plant. The application would also need to obtain the UDOT labor and equipment rates. This could be accomplished by utilizing data obtained through the labor and equipment interfaces noted later in this document.								

Total Requirements:	**19**	
OTB Requirements:	**0**	
Customization Requirements:	**0**	
Requirements Not Met:	**0**	
Percent OTB:	**0%**	

Mandatory:	0	0%
Important:	0	0%
Desirable:	0	0%
Total:	19	
No Response:	19	

7. Interface and System Requirements

Req #	Functional Requirement	Importance			Meets Requirement?			Level of Effort	
		Mandatory	Important	Desirable	Yes, OTB	Yes, Customization Required	No	Hours	$
6.01	**Work Order Labor Time Entry♦OUT♦ FINET:** a.) Transfer maintenance application labor time entry information associated with Work Order to the SAP/FINET payroll system. The interface may have two components, if direct connection cannot be accomplished utilizing APIs, web services, etc.: -Validate maintenance payroll data within the maintenance environment (database process) and then populate associated tables in a staging schema in preparation for further processing into the payroll system, if applicable. -If a direct connection to the SAP/FINET payroll cannot be achieved in a secure efficient manner, a DTS (UDOT) scheduled job will be utilized to pull the payroll data from the tables in the staging schema and populate the SAP/FINET payroll system; abiding by all applicable security protocols								
6.02	**Employee Data♦IN♦ FINET HR Data Warehouse:** a.) Automatically transfer appropriate Human Resource information for each Maintenance Station/Department from the FINET / FINET Data Warehouse into the Maintenance Application's database, to be validated and consumed according to applicable business processes.								
6.03	**Work Order Equipment Usage♦OUT♦ FINET:** a.) Once Maintenance equipment usage data is recorded within a given work order (and associate day cards), the data is validated, according to predefined business rules. The records that pass the validation process are transferred to a staging schema in preparation for extraction and *further processing before reaching its final destination into the FINET system. The FINET system evaluates the Maintenance equipment usage data assigning any associated costs, with consideration to appropriate categories and coding block information. *This interface may require manual processes outside of the Maintenance database.								
6.04	**Equipment Data♦IN♦ SFS (State Fleet System):** a.) Transfer new and existing data from the State Fleet System (SFS), residing in a staging schema, then finally to the Maintenance database, with the goal of updating the Maintenance fleet related equipment inventory. b.) Maintenance utilizes the fleet equipment inventory in the following ways: •Specify fleet equipment used on a work order, noting costs in the following categories: -Maintain assets -General maintenance tasks -Fleet equipment repairs -Fleet equipment preventative maintenance •Designate which station/department a piece of equipment or a resource is assigned to -Track ownership -Provide functionality for resource sharing, i.e. equipment, people and materials. This would also include the ability to request resources from the owner/assignee c.) Track associated costs; ensuring costs are associated with the proper project even if a resource is utilized outside of the Maintenance division such as in Construction.								
6.05	**Material Master (Commodity) Code List Synchronization♦IN♦ FINET:** a.) FINET will provide the master list of materials and their data elements to be consumed within the Maintenance application(s) in the following business processes: •Material receipts •Work Orders -Identification of material usage -Identification of material stock bins •Definition of materials on activity standards (see activity standard details in section ?) Important related data elements 1.) Material class 2.) Commodity codes 3.) Descriptions 4.) Measurement unit 5.) Average unit cost								
6.06	**Material Stock and Stores♦IN♦ FINET:** a.) FINET is currently the master of all material and inventory data. This interface will transmit this material inventory data from FINET to the Maintenance application database. Items delivered to a UDOT warehouse on an as needed basis, i.e. asphalt, salt and sand may not be available in the FINET inventory until months after its delivery and consumption or usage. Consequently, UDOT has made the decision to Direct Charge these specific items. These are considered to be "non-inventoried" items.								
6.07	**Work Order Material Usage♦OUT♦ FINET:** a.) Once Maintenance material usage data is recorded within a given work order, the data is validated, according to predefined business rules. The records that pass the validation process are transferred to a staging schema in preparation for extraction and *further processing before reaching its final destination into the FINET system. The FINET system evaluates the Maintenance material usage data applying the usage amounts to the various warehouses, depending on the coding block information supplied by the Maintenance work order. The data is crucial to the proper material costing within FINET. b.) *This interface may require manual processes outside of the Maintenance database.								
6.08	**Bridge Work Requests♦IN/OUT♦ PONTIS:** Inserts work request records into the Maintenance application database based upon inspections performed by the Structures division of UDOT. These inspections are performed on an ongoing basis, so additional comments may need to be added by updating an existing work request and/or a subsequent open work order, identified by its structure ID; which is assigned by the Structures division								
6.09	**Bridge Inventory♦IN♦ PONTIS:** Extracts structure inventory records from the PONTIS database and creates new and/or updates the Maintenance application database structure inventory records.								

6.1	**Damage Claims and Other Reimbursement♦IN♦ FINET:** This interface extracts operations damage claim reimbursement information for accident reports performed by Maintenance. The purpose of this interface is to populate the Maintenance database with reimbursable information for all damage repairs for tracking, follow up and reporting pertaining to Maintenance station and region budgets.								
6.11	**Maintenance Expenditures (Originating in FINET♦IN♦ FINET:** All Maintenance expenses in the FINET_ACCOUNTING_JOURNAL and INTERNAL_COSTING_JOURNAL tables residing in the FINET staging schema will be extracted to populate Maintenance database tables to be utilized for various reports, including expenditure reports and accurate budget tracking at the Maintenance station and region level.								
6.12	**Equipment Unit Rates♦IN♦ FINET:** Utilizes the Maintenance equipment unit rates stored in a staging schema by an ongoing daily automated process that extracts the appropriate data from the FINET system. Once the Maintenance application tables are populated with the new and/or updated data, it is used for equipment usage rates on work orders and various reports, including budget tracking and projections.								
6.13	**ePM ♦IN♦:** a.) Show contingency expenditures - for reporting b.) Ensure maintenance equipment costs utilized for Construction projects are charged to the Construction Project versus the Maintenance Station's budget or "owner" of the equipment								
6.14	**Procurement♦IN♦:** a.) Provide list of Contractors approved to perform Maintenance work, including all helpful contract related information.								
6.15	**UPlan ♦IN and OUT♦:** See section nine for the information on UPlan								
6.16	**Data, Documents, and Image Migration:** UDOT currently has a large amount of data in current business systems. This data will need to be migrated into the selected solution. It will be critical that this is done is a smooth manner to not lose data or have data unable to be accessed during transition.								
6.17	**Data Imports:** Provide the ability to map and import small or large datasets to the Maintenance database, with the system programmatically enforcing applicable business rules, validation and data integrity. This functionality would be required on a continuous basis, with the data coming from other UDOT systems (databases) and/or third party UDOT contractors.								
6.18	**Add/Modify Page Conten** Ability to add/modify internal and external Links								
6.19	System must be driven by innovative and changing business requirements and not directed or limited by technology								
6.2	Single Sign-on, interfacing with Google Apps								
6.21	Capability to utilize web services or future technology. (For example, ArcGIS web services)								
6.22	User level application access management associated with job responsibilities and predefine application roles. These predefined roles would be created and maintainable by a system administrator within an administrative application itself and/or administrative web pages and associated reports. Some examples of system administrator functionality with regard to user access management: a.) Define user roles corresponding to job responsibilities b.) Create, update, or terminate user access by application, if applicable c.) Assign/update user roles, thereby providing access to specific applications and their respective content or functionality								
6.23	Approximately 1,200 total users with the potential of 200+ concurrent users. System should be at an enterprise level, robust, highly scalable, load balanced, and effectively allocate its resources.								
6.24	Data integrity must be enforced in the application, as well as at the database level with primary and foreign keys, database constraints and database level business rules.								
6.25	The system must provide a mechanism to perform validity checks of data entered at the time it i entered or when data may be imported during an interface process. When data is being entered by an application user a.) Edits, data ranges and relationships shall provide the equivalent of manually reviewing data entry and checking for errors b.) Error messages will be informative indicating why the information is outside of the acceptable range and what corrections must be made. c.) The system should suggest a solution or suggest where to search for additional help on that topic. d.) The use of smart drop down lists, selections, etc. ensuring business requirements are met while eliminating data entry errors wherever and whenever possible.								
6.26	Transactions not passing all edits must be stored in the database for later correction and elimination of re-entry. Possibly stored in separate database error tables.								
6.27	**Electronic Signature and/or Approvals** The system must allow authorized personnel the ability to perform a final validation of data according to business requirements, e.g. Employees can verify payroll/timesheet data prior to submittal, utilizing electronic sign-off meeting audit requirements.								
6.28	Create audit trail by logging the date, time and user id when records are created, updated and deleted.								
6.29	Provide the ability for a system administrator to lock a user or a group of users out of the system on demand or on a regular automated schedule. This may be necessary on a biweekly basis for payroll processing.								
6.3	Ability to send messages to one user, a group of users or all users.								

6.31	**All applications must have the following:** a.) Adhere to UDOT security processes, standards and protocols b.) Include administrative forms and reports c.) Always consider mobile functionality when designing work flow, business flow and page content d.) Report content must be categorized into state, region and station groups or categories, along with the ability to display the data in graphs, charts, etc. e.Users should be able to create reports not only for themselves, but for other users. They should be able to share a report they create with another user or group of users providing a report and/or provide a report to be used as an example to another user where that user could then create their own copy of the shared report and then modify it or customize it to meet their own specific reporting requirements. f.Responsive Design - web development that allows for different screens sizes, platforms, and orientation (i.e. Mobile devices, desktops, etc.)								
6.32	**Application Hosting Services:**UDOT is requiring a solution where the proposer provides the hosting of the application. See the requirements for the technical proposal write-up. Vendor must provide a legitimate "Software Source Code Escrow Agreement" which establishes and maintains an escrow with an acceptable and reputable company to protect UDOT's confidentiality, ownership and best interests. The vendor must also provide an acceptable Service Level Agreement (SLA) meeting UDOT's required level of service, quality, responsibilities, confidentiality, security policies, backup and recovery, and guaranteed uptime of 99.99%.								

Total Requirements:	**32**
OTB Requirements:	**0**
Customization Requirements:	**0**
Requirements Not Met:	**0**
Percent OTB:	**0%**

Mandatory:	0	#DIV/0!
Important:	0	#DIV/0!
Desirable:	0	#DIV/0!
Total:	0	
No Response	32	

Mobile Applications

Req #	Functional Requirement	Importance			Meets Requirement?			Level of Effort	
		Mandatory	Important	Desirable	Yes, OTB	Yes, Customization Required	No	Hours	$
7.01	**Multi-Platform:** In order to allow UDOT to take advantage of the current and future market of mobile devices, the mobile apps in its new MMS system shall be designed to be cross platform. The key operating systems being considered as cross platform, are Apple's iOS, Google's Android and Microsoft's Windows Mobile. The vendor should be able to articulate their approach to mobile deployment as well as the process they utilize to provide dynamic app updates with minimal interruption to system users.								
7.02	**Multi-Device Size:** UDOT desires the ability to select the right blend of devices to accomplish the most economical and functional implementation of mobile devices. There are times when a tablet is more functional for some tasks, but a phone based app can be used for more routine simple record keeping. UDOT will work with the winning proposer to find the right balance of devices and platforms to leverage the maximum potential of the MMS system and UDOT's workforce.								
7.03	**Disconnected Mode:** The UDOT highway network covers over 5,800 centerline miles throughout Utah. Because of Utah's diverse mountain topography and large uninhabited areas there are many locations that are not currently served by cellular data services. In addition to the challenges of Utah's topology, providing cellular data plans for 700+ employees would be cost prohibitive. As such, UDOT is looking for a vendor that can provide mobile apps that are the optimal balance between field functionality and cost effectiveness in a statewide deployment. While not all system functions will be replicated in a mobile environment, those that are deemed critical or useful will be a blend of cellular data connected and disconnected. The vendor should identify their current abilities and system functions that can be utilized in a disconnected mode as well as describe their intentions to help UDOT develop a custom set of field apps as part of the project. Ultimately, UDOT envisions a mobile platform that is able to find the balance of device size, disconnected maps, app complexity and cost. To accomplish this, the proposed system shall be able to demonstrate effective data flow management, ability to store area maps (tiled to allow for detail in selected areas) and provide seamless consistency across multi-platform devices.								

Total Requirements:	**3**
OTB Requirements:	**0**
Customization Requirements:	**0**
Requirements Not Met:	**0**
Percent OTB:	**0%**

Mandatory:	0	#DIV/0!
Important:	0	#DIV/0!
Desirable:	0	#DIV/0!
Total:	0	
No Response:	3	

GIS Requirements

Req #	Technical Requirements	Importance			Meets Requirement?			Level of Effort		Comments
		Mandatory	Important	Desirable	Yes, OTB	Yes, Customization Required	No	Hours	$	
8.01	**UDOT's Existing Spatial Data:** UDOT's spatial data is managed in an Oracle database, and layers that are intended to be consumed by the public, or department-wide, are published from an enterprise or a file geodatabase to web services in UPlan, UDOT's ArcGIS Online platform. Depending on the end user needs and business case, these products are then made available as services, maps, or apps. Selected data layers can also be filtered and downloaded through the Open Data portal. The maintenance management system will need to consume, read, and write to these live data services, not copy them to the vendor's system. It's understandable that in order to go offline some level of temporary copying to a mobile device would be needed. **Requirements:** a.) Use existing data sources b.) Update data and keep asset inventory by enabling mobile data collection as new assets are constructed c.) Write in and out of an enterprise geodatabase d.) Incorporate any schema changes happen in UDOT's databases e.) Do not copy the data - consume UDOT REST services f.) Dashboards are fed by live data and update accordingly g.) Track and retain historical data - do not overwrite records h.) Spatial data is stored on UDOT systems - related materials such as work orders or performance metric information can be stored in the vendor's system									
8.02	**Tie Spatial Data to Other Business Systems** UDOT has many different business systems that handle various tasks and applications. The maintenance management system must be able to tie these different systems to unique spatial assets where applicable. **Requirements:** a.) One-to-many relationships; e.g., multiple work orders (historical information) to one asset b.)Tie non-spatial data (e.g., work orders) to all geometry types - points, lines, and polygons c.) Must fit with existing dashboard systems (e.g., Socrata) d.) New maintenance station boundaries may be created and/or existing boundaries may change. When this happens, the assets with mile point locations located within the respective station boundaries must be updated accordingly. e.) Update assets/features when the LRS changes (Route and Milepost) -When changes are made to UDOT's LRS on a particular route, the maintenance management system must incorporate these updates and ensure that all assets along this route are updated accordingly. This must be accomplished in a way that does not result in the loss of any data or relationships - e.g., historical inspection records are retained and maintain their existing relationship to assets.									
8.03	**Dashboard and User Interface** UDOT personnel must be empowered, not hindered, by the business systems that they are required to use to perform their daily tasks. Accordingly, the user interface and dashboard of the maintenance management product must be intuitive, easy to learn, and look consistent across multiple different applications. **Requirements:** a.) Clean, easy-to-use interface in both mobile and desktop environments b.) Do not make maintenance personnel learn multiple user interfaces and dashboards c.) Dashboard interface can be configured by UDOT personnel d.) Reminders for tasks can be triggered by an event, or on a set calendar schedule e.) Functions in desktop and mobile environments, and across multiple operating systems									
8.04	**Asset Degradation and Maintenance Prioritization** Assets degrade over time, and one of the difficult tasks that UDOT maintenance faces is the need to prioritize limited funding to meet these seemingly unlimited needs. The maintenance management system should support UDOT's project prioritization and funding decisions by providing asset tracking, risk, and forecasting metrics. **Requirements:** a.) Help identify where limited dollars are best spent b.) Identify areas of high risk d.) Track asset lifecycle, degradation, value, maintenance needs, and cost forecasting									
8.05	**Mobile Data Collection** UDOT's maintenance stations are spread across the state in both urban and rural areas. The maintenance management system must be fully mobile capable, to support work in areas without cell coverage and also to support work on mobile devices for which data plans have not been purchased. **Requirements:** a.) Ability to connect to WiFi at the beginning and end of each work day; download all materials (e.g., base maps, spatial data, assets, work orders, etc) necessary to complete the day's tasks, and then synchronize when connectivity is available b.) Configurable apps c.) Work on all platforms - Windows, Android, iOS									

8.06	**LRS and Esri Roads and Highways Integration** A linear referencing system (LRS) is a key component to managing transportation and roadway assets. The simple explanation of an LRS system is utilizing Route and Milepost for location information for everything that takes place on the roadway. This would include inventory features, events, Work Orders, etc. The ability to work with a LRS system is critical to the functionality of the selected MMS. UDOT uses the LRS across nearly all business functions to bring a consistency in location information. It also assists in knowing which route data is tied to. The new maintenance management system needs to work with both UDOT's existing Oracle LRS and the planned move to Esri's Roads and Highway system. Data in the system must be kept in sync with the current LRS, and must be able to exchange data back and forth. **Requirements:** a.) Full integration with Oracle LRS and then Esri's Roads and Highways b.) No version-locking - the maintenance management system must not have a dependency on the version of Roads and Highways c.) Exchange data back and forth with Roads and Highways d.) Identify the interface - does the system use internal or external events? e.) Data must be kept in sync with the most current version of the LRS f.) Ability to handle data that is spatially located by both route and milepost and/or latitude and longitude g.) Support Federal reporting h.) Management of local assets on non-state routes									UDOT may accept the use of Microsoft SQL Server for certain uses, such as configuration or reporting if an add-on component of the system requires its use. If any use of SQL server is proposed, the vendor must justify its benefit over Oracle.

Total Requirements:	**6**
OTB Requirements:	**0**
Customization Requirements:	**0**
Requirements Not Met:	**0**
Percent OTB:	**0%**

Mandatory:	0	#DIV/0!
Important:	0	#DIV/0!
Desirable:	0	#DIV/0!
Total:	0	
No Response:	6	

Feature Inventory

Req #	Functional Requirement	Importance			Meets Requirement?			Level of Effort		Comments
		Mandatory	Important	Desirable	Yes, OTB	Yes, Customization Required	No	Hours	$	
9.01	**Feature Inventory Database:**Each of the features have their own unique set of attributes and condition information. The new MMS will need to be able to have each of the features contained in their own table structure that is simple to setup and manipulate. The attributes will be a combination of pick lists and free fill data fields. The system will need the ability for setting up of these pick lists specific to that feature. Some assets have a parent/child relationship that will need to be linked within th new MMS. An example is the relationship between a sign and the sign assembly. Within the sign database will be a unique ID that correlates to a specific sign assembly in another data data. A parent (sign assembly) may have multiple children (signs) associated with it.									
9.02	**Temporal/Historical Retention:**Part of maintaining the Utah Roadways is the ability to see what work has been done in specific areas over a period of time. The new MMS will need to be able to retain the history of changes made to a specific asset. If a sign on the side of the road is being replaced every year because it is getting hit, UDOT would need to be able to see the history of Work Orders that has been done in that specific location. This may lead to the need for protection around the sign or possibly placing the sign further down the road. Many times a feature is retired due to it being moved to a different location or being removed entirely. The new MMS will need to be able to retain the record of that asset so it can be pulled up at a later time. This may be achieved by having an inactive/active status or some other method of being able to sort this data separate from the active features on the roadway.									
9.03	**Work Request/Orders:** The new MMS will need the ability to tie Work Requests and Work Orders to specific features on the road or facilities. A Work Request or Work Order may be tied to one specific asset or it may be multiple assets. A crew may be going out in the field to only work on one barrier end treatment or they may be working on dozens of signs in a specific area. The system will need the flexibility to consider various scenarios.									
9.04	**Route and Milepost:**In addition to GPS location information, UDOT also utilizes a Route and Milepost to identify the location of any feature on the roadway. This was discussed in further detail earlier in Section Nine.									
9.05	**Mapping:** It would be helpful for UDOT to be able to view assets on a map within the MMS. This would enable crews to be able to quickly see which features are in a specific area without having to go out to a separate mapping program. Resource Documents for the Vendor/Proposer: •Current feature inventory •Current database structure showing pick lists									
9.06	**Mobile Feature Inventory Collection/Updating:**To be able to keep the Feature Inventory as up to date as possible, it's critical for individuals to be able to update and add features to the inventory while in the field. Mobile applications that allow for updating of Feature Inventory assets and also to add in newly installed or found assets will provide UDOT the ability to keep their inventory current. Updating may involve changing different attributes of an asset or perhaps the location. These applications will need to be easy to use and allow for offline functionality If the applications require significant clicks and data entry, the likelihood of the application being used goes down.									

9.07	**Dynamic Quality Assessment (DQA):**The intent of the DQA functionality is to utilize many of the built in features and functions of the MMS system to represent work crew efficiency, system health, and funding needs. Work Orders, Work Requests, feature inventory and condition assessments will serve as the basis of the calculations. Feature inventory will be broken down into sub classifications such as Safety Critical, Non-Critical, Functional or other classification to represent the urgency with which it needs to be repaired. Safety Critical items will be things such as impact attenuators or signs. Non-Critical would be things such as right-of-way delineation fence that does not control access. As the new MMS system begins to develop more work order history, system health and UDOT maintenance crew response will be graphically represented using financial, temporal and geographical data collected during the work order process. For example, the time to complete safety critical functions will be a key performance indicator. The DQA process will also have the ability to collect condition data on assets that are not easily collected by the LiDAR collection process (done by others). Highway features that are not visible from the roadway include edge rut, culverts, drainage boxes, etc. The ability to assess the condition of these items will also be critical to the overall representation of system health. Finally, the system will be able to have drill down dashboards that help users identify, locate and review highway cost of maintenance, types of costly repairs, outstanding needs, crew efficiency, frequently repaired items or other aspects that will be beneficial to help direct work, funds or future needs.									

Total Requirements:	**7**
OTB:	**0**
Customization:	**0**
Requirements Not Met:	**0**
Percent OTB:	**0%**

Mandatory:	**0**
Important:	**0**
Desirable:	**0**

No Response: 7

User Friendly

Req #	Technical Requirements	Importance			Meets Requirement?			Level of Effort		Comments
		Mandatory	Important	Desirable	Yes, OTB	Yes,	No	Hours	$	
10.01	Because the application will be used by individuals with a wide range of computer experience and understanding, it is critical to the success of the implementation of the software that the application be easy and simple to use.									
10.02	The application must be usable without reading a printed guide. This could include tooltips, pop up windows, helps, and short video demonstrations. If the complexity of the tasks being automated cannot feasibly be embedded into the software interface, reading a printed guide may be unavoidable. In this case, the most that any individual user should have to read for any particular application is 1-2 pages— short enough to read in one sitting.									
10.03	Users should be able to accomplish every task and entry with the fewest possible keystrokes. For instance, dates should not necessitate typing four digits for the year unless the context of the given field leaves considerable doubt as to which millennium might be intended. In many cases, keying in any characters at all for the year may be an unnecessary expense of the users' time. Functionality such as auto tab ahead when fields are filled in would also be an example.									
10.04	The interface should enable all interaction techniques and input to be discoverable and chosen from a browse- able, hierarchical structure, arranged in order of the functions the user needs to perform. For example, this can be satisfied with multiple graphical choices, in the form of icons and segmented clickable graphics, meaning the graphic or report would have "drill down" functionality, with the link navigating to additional details about the data linked to the summary or top level report. What this requirement specifically precludes is reliant solely on any of the following techniques: command line syntax; parameter (INI) file options not built into the interface; techniques supported only by combination keystrokes, mouse techniques, or combinations thereof; techniques requiring knowledge of special, manually entered values.									
10.05	The interface and messages should make it clear why the program does what it does.									
10.06	Intuitive, using provided information to predict what the user wants.									
10.07	Searchable									
10.08	Speech to text capabilities									

Total Requirements:	**8**
OTB:	**0**
Customization:	**0**
Requirements Not Met:	**0**
Percent OTB:	**0%**

Mandatory:	**0**
Important:	**0**
Desirable:	**0**

No Response: **8**